MAUL FOSTER ALONGI INC.

STORMWATER EVALUATION WORK PLAN
TRUCK MANUFACTURING PLANT, FREIGHTLINER LLC

FREIGHTLINER LLC
Project No. 8006.10.01

April 21, 2006

STORMWATER EVALUATION WORK PLAN

TRUCK MANUFACTURING PLANT
FREIGHTLINER LLC
PORTLAND, OREGON
DEQ ECSI NO. 2366

Project No. 8006.10.01

April 21, 2006

Prepared for:

FREIGHTLINER LLC

Prepared by:

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April 21, 2006
Project No. 8006.10.01

Mr. Michael Romero
Voluntary Cleanup and Site Assessment
Oregon Department of Environmental Quality
2020 SW Fourth Avenue, Suite 400
Portland, Oregon 97201-4987

Re: Revised Stormwater Evaluation Work Plan for Truck Manufacturing Plant, Freightliner LLC, Portland, Oregon (DEQ No. WMCVC-NWR-02-02 and ECSI # 2366)

Dear Michael:

On behalf of Freightliner LLC (Freightliner), Maul Foster & Alongi, Inc. (MFA) is submitting a revised stormwater evaluation work plan for the above-referenced site. The work plan was revised to incorporate additional data requests made by the Oregon Department of Environmental Quality (DEQ) during a meeting on March 14, 2006, and in a phone conversation on March 24, 2006. Specifically, DEQ requested the addition of hexavalent chromium, polychlorinated biphenyls (PCBs), and phthalates to the list of chemicals of interest for stormwater. DEQ also requested the collection and analysis of a solids sample from the proposed cleanout of the stormwater system; this sample will be analyzed for copper, lead, zinc, PCBs, phthalates, and polycyclic aromatic hydrocarbons. Freightliner has concerns regarding the usefulness of the data being requested and also has concerns that the interpretation of any in-line solids data is limited given the absence of similar data from other stormwater dischargers. However, Freightliner will follow DEQ's recommendations in performing the proposed sampling.

DEQ also requested more information about the history of spills at the facility, the stormwater treatment system, and documentation of catch basin cleanouts. As discussed during the March 14 meeting, this information will be included in the final stormwater evaluation report.

If you have any questions, please contact me or Zane Gibson at Freightliner.

Sincerely,

Maul Foster & Alongi, Inc.

Anna St. John, RG
Project Manager

cc: ✓ Zane Gibson, Freightliner LLC

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STORMWATER EVALUATION WORK PLAN
TRUCK MANUFACTURING PLANT
FREIGHTLINER LLC
PORTLAND, OREGON
(DEQ ECSI NO. 2366)

Prepared for

Freightliner LLC

April 21, 2006

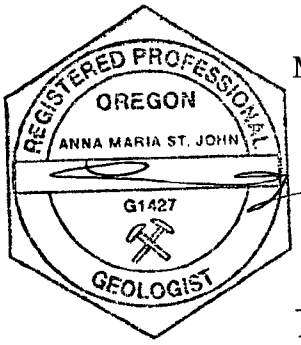
Prepared by

Maul Foster & Alongi, Inc.
3121 SW Moody Avenue, Suite 200
Portland, Oregon 97239

Project No. 8006.10.01

Stormwater Evaluation Work Plan
Truck Manufacturing Plant
Freightliner LLC

The material and data in this report were prepared under the supervision and direction of the undersigned.



Maul Foster & Alongi, Inc.

Anna Maria St. John, RG, Project Manager

Jeffrey Peterson, PhD, Principal Environmental Scientist

Madi Novak, Project Environmental Scientist

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ACRONYMS AND ABBREVIATIONS

AST	aboveground storage tank
BMP	best management practice
COC	chain-of-custody
COI	chemical of interest
COP	City of Portland
DEQ	Oregon Department of Environmental Quality
EC	Environmental Center
Freightliner	Freightliner LLC
JSCS	Joint Source Control Strategy
LWG	Lower Willamette Group
MFA	Maul Foster & Alongi, Inc.
mg/L	milligrams per liter
MOU	Memorandum of Understanding
MRL	method reporting limit
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RM	river miles
SLV	screening level value
SVOC	semivolatile organic compound
SWE	stormwater evaluation
TMP	Truck Manufacturing Plant
TPH	total petroleum hydrocarbons
TSS	total suspended solids
UPRR	Union-Pacific Railroad
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WPB	wheel paint booth

1 INTRODUCTION

On behalf of Freightliner LLC (Freightliner), Maul Foster & Alongi, Inc. (MFA) has prepared this revised work plan to evaluate the stormwater pathway for the Truck Manufacturing Plant (TMP) at 6936 North Fathom Street in Portland, Oregon (see Figure 1-1). MFA submitted a work plan on February 28, 2006. The work plan was revised to incorporate additional data requests made by the Oregon Department of Environmental Quality (DEQ) during a meeting on March 14, 2006, and a phone conversation on March 24, 2006.

1.1 Regulatory Framework for Stormwater Evaluation

This report was prepared at the request of the DEQ to identify methods and an approach to evaluate the stormwater pathway and possible stormwater impacts to the Willamette River. The stormwater pathway evaluation was requested by DEQ to complete the site investigation as required by the 2002 Voluntary Cleanup Agreement between Freightliner and the DEQ.

The TMP site is approximately 1,400 feet from Swan Island Basin between river miles (RM) 8 and 9 of the Willamette River in the Portland Harbor. Freightliner's outfalls discharge to the City of Portland (COP) drainage basin M-1, which discharges to Swan Island Basin. Because the Basin connects to the Willamette River in the Portland Harbor, the DEQ has requested that Freightliner conduct a stormwater screening evaluation for the site. The scope of the evaluation was discussed during a September 8, 2005, meeting with the DEQ and presented in an outline in the October 12, 2005, Third Quarter Progress Report, and generally follows the approach presented in Appendix D of the EPA/DEQ Joint Source Control Strategy (JSCS).

1.2 Purpose of the Stormwater Evaluation

In general, the primary pathways by which Willamette River sediment in the Portland Harbor may be impacted by chemicals from upland sites include overland transport, groundwater-mediated transport to sediment and/or surface water, direct over-water discharge, riverbank erosion, and direct discharge via stormwater or wastewater (DEQ and USEPA, 2005). Because the TMP site is 1400 feet from the Swan Island Basin,

which connects to the Willamette River, the only transport pathway to the Portland Harbor with potential to impact sediment is discharge via stormwater

The purpose of the stormwater evaluation (SWE) is to evaluate whether chemicals in stormwater at the site are migrating to the Willamette River at concentrations that may pose unacceptable risks to human health and the environment, and to identify contaminant sources requiring control, if any. This work plan describes Freightliner's approach to evaluating the direct-discharge-via-stormwater pathway.

2 SITE BACKGROUND

2.1 Site Description

The TMP is located at 6936 N Fathom Street, Portland, Oregon (Multnomah County) in the Swan Island Industrial Area, and includes approximately 25 acres (see Figure 1-1). The property is zoned for general industrial (IG2) use. The property is flat and triangular in shape, and contains a Class 8 truck tractor manufacturing building, an Environmental Center (EC) (where new products and wastes are stored in 55-gallon barrels), the WABCO building, the aboveground storage tank (AST) farm (where petroleum products and wastes are stored), paved parking lots and parts storage areas, and a paved noise-test track (see Figure 2-1). Most (99 to 100 percent) of the area around buildings and structures is paved. The elevation of the site is approximately 20 feet relative to the COP datum. Union-Pacific Railroad (UPRR) tracks run north-south and form the western boundary of the site; tracks also run east-west, parallel to the southwestern property boundary. A large parking lot (owned by Freightliner) is east of the east-west UPRR tracks and abuts North Cutter Circle. A steep, vegetated hillside (Mocks Crest) is present along the north property boundary.

Swan Island Basin, which is connected to the Willamette River in Portland Harbor, is located approximately 1,400 feet west-southwest of the site.

2.2 Site History

Since its construction in 1969, the plant has been used for the manufacture of diesel truck cabs; manufacturing occurs in building structures covering 500,000 square feet (46 percent) of the property. The site was previously undeveloped bottomland or marsh that was frequently inundated by the river and was historically referred to as Mocks Bottom. The site and surrounding properties were filled with material dredged from the Willamette River by the Port of Portland.

2.3 Operational Areas and Chemical Usage

The present and historical operations are thoroughly described in the *Focused Preliminary Assessment—Freightliner Truck Manufacturing* Plant (Exponent 2001). Operational areas, as described in that report, are shown on Figure 2-1.

2.4 Spill History

Historical, very minor, spills are addressed in *Focused Preliminary Assessment—Freightliner Truck Manufacturing* Plant (Exponent 2001). Freightliner reviewed documentation of accidental spills that occurred on site since 2001 (Gibson, 2005). Based on this review, it appears that all documented spills were cleaned up before spilled materials had reached a catch basin (Gibson, 2005), which is the same conclusion reached by Exponent with respect to the pre-2001 minor spills which they detailed. As discussed in greater detail below, catch basin inserts are used in all of the catch basins, are inspected monthly, and are replaced quarterly or more frequently, if needed. Catch basin sediments are removed approximately every other month.

2.5 Previous Investigations

Freightliner has submitted three reports documenting the results of the investigation of potential upland source areas: *Focused Preliminary Assessment* (Exponent, 2001); *Remedial Investigation Data Report* (MFA, 2003), and *Remedial Investigation Data Report: 2003 Holiday Shutdown* (MFA, 2004). Generally, the investigations revealed localized soil impacts. Detected chemicals in soil included total petroleum hydrocarbons (TPH), a few volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). The impacted soil is under pavement or under a building's foundation, thereby eliminating possible leaching of TPH, VOCs, or SVOCs in soil to stormwater runoff. Contaminated soil (near the noise-test track, former underground storage tanks [USTs], and former wheel paint booth [WPB]) was excavated and disposed off site in a removal action conducted in December 2002 (MFA, 2003). Impacted soil also was removed near a former battery charging area inside the plant and near the former AST farm (which was immediately southwest of the current AST farm) in late 2003 and early 2004 (MFA, 2004).

Shallow groundwater (less than 25 feet below ground surface) is locally impacted with VOCs around the former USTs and former WPB (see Figure 2-1). Impacts are confined to the area immediately around the former USTs and under the plant near the WPB (MFA, 2003 and 2004).

Freightliner has also evaluated its potential sources to stormwater and evaluated the effectiveness of its best management practices with respect to the control of those sources

in its report on *Stormwater and Best Management Practices: Review and Assessment* (MFA, 2004).

3 FACILITY STORMWATER SYSTEM

In September 1991, the DEQ issued a general National Pollutant Discharge Elimination System (NPDES) permit (1200-L) for the discharge of stormwater at the plant. The permit renewal application was submitted in April 1996 and the DEQ issued a 1200-Z on July 22, 1997. Stormwater and products used and wastes generated are managed consistent with protocols outlined in the Storm Water Pollution Control Plan (EMCON Northwest, 2000) and Spill Prevention, Control, and Countermeasure Plan (URS, 2001).

Freightliner is in compliance with its 1200-Z permit. This evaluation is not being provided under that permit, but rather pursuant to DEQ's assertion (as reflected at page 5-9 of the JSCS) that it has the authority to require such an evaluation pursuant to its environmental cleanup regulations.

Stormwater runoff at the site is routed to 28 lined catch basins, three oil/water separators (which discharge to the COP sanitary sewer system), and a StormFilter™ filtration system, and is discharged to the COP stormwater system via two outfalls (see Figure 3-1). The outfalls are located on North Fathom and North Ensign streets. Seventeen catch basins discharge to the North Ensign Street outfall. Eleven catch basins discharge to the North Fathom Street outfall. All catch basins are fitted with oil and sediment insert filters, which are inspected monthly and changed out as needed (with an average change-out frequency of every other month). Stormwater monitoring has been conducted at the North Fathom Street and North Ensign Street outfalls since June 1993. Currently, samples are analyzed for the following parameters: total suspended solids (TSS), oil and grease, pH, and total metals (copper, lead, and zinc). From 1993 through 1997, samples also were analyzed for arsenic, cadmium, chromium, mercury, and nickel.

Freightliner's outfalls discharge to COP drainage basin M-1, which discharges to Swan Island Basin. Figure 3-2 shows the infrastructure and subbasins of drainage basin M-1. The M-1 drainage basin drains a large area (approximately 175 acres) in a highly industrial and commercial use area "with approximately 24 different addresses and a total of 42 different facilities" (COP, 2003).

3.1 Operational BMPs

Table 3-1 presents the operational best management practices (BMPs) currently employed at the site, as reported in the March 2004 *Stormwater and Best Management*

Practices: Review and Assessment (MFA, 2004). The table also notes the frequency of the BMP, who is responsible for ensuring that the BMP is performed, and how the BMP is documented. Freightliner personnel were interviewed and a site reconnaissance conducted in February 2004 to assess actual implementation of the BMPs noted in Table 3-1. Freightliner has confirmed the continued implementation of all Table 3-1 BMPs.

The scope of the operational BMPs appears appropriate for the site and site activities. Based on the employee interviews and site observations, the identified operational BMPs are properly implemented. Based on site observations, Freightliner has increased the frequency of sweeping in less accessible areas near catch basins. This BMP requires movement of truck parts to allow sweeping in less accessible areas. In addition, because some new truck components are received in plastic packaging and temporarily stored in uncovered areas, Freightliner ensures that when the plastic packaging is removed, it is promptly and properly disposed.

3.2 Structural BMPs

Table 3-2 presents the structural BMPs currently in place on the site, as reported in the March 2004 *Stormwater and Best Management Practices: Review and Assessment* (MFA, 2004). Freightliner has confirmed the continued operation of all these structural BMPs. Among those structural BMPs are the following:

- Three oil/water separators (which discharge to the sanitary sewer)
- StormFilter™ filtration system with leaf compost media for soluble metals
- Completion of a five-year schedule to coat the galvanized roof with a Neogard® cover, initiated in 2002, as discussed below
- Bioswale installed for new truck parking area in the offline yard
- Enclosed facility operations using and/or generating hazardous substances
- Enclosed areas for storage of hazardous substances

In addition, as indicated in Table 3-1, catch basin inserts are used in all of the catch basins, are inspected monthly, and are replaced quarterly or more frequently, if needed. Catch basin sediment is removed about every other month.

Freightliner is continuing to identify opportunities for additional structural BMPs. As indicated above, in 2002, Freightliner implemented a five-year roof replacement plan to cover the entire existing galvanized roof with Neogard. The roof replacement was completed in October 2005. Neogard is a closed cell high density urethane foam with

Neogard top coat designed provide a continuous seamless cover. Thus, the new Neogard cover prevents stormwater from coming into contact with the galvanized roof, which should result in an overall reduction in zinc in stormwater.

In January 2003, Freightliner installed a Stormfilter™ filtration system at the North Ensign Street outfall. This particular model was specifically selected because of its ability to remove zinc. Freightliner is working with the StormFilter™ manufacturer to enhance the performance of the system, including trying to identify a more effective filter media for zinc.

4 SEDIMENT SCREENING

In a September 08, 2005 meeting, the DEQ recommended a tiered process to identify chemicals to be evaluated in a SWE. The first step in the process is to determine if sediment in the Portland Harbor has been impacted as a result of stormwater discharge from a stormwater outfall into Portland Harbor. This step involves evaluating sediment chemistry results for samples near stormwater discharge points to the Portland Harbor. The initial chemicals of interest (COIs) for the discharge point are identified by comparing sediment concentrations with DEQ's very conservative Level II ecological screening level values (DEQ Level II SLVs) for sediment to identify chemicals that could potentially pose unacceptable risks to human health and the environment. The final step is to identify an upland site's stormwater COIs; site-specific COIs are identified by reviewing site operations to determine which of the COIs detected in sediment near the discharge point may have been used and/or accidentally released at a site.

For a variety of reasons, exceedance of a DEQ Level II SLV does not indicate sediment conditions that are toxic to potential ecological receptors. These SLVs are typically estimates of threshold effect concentrations (see MacDonald et al., 2000) and represent concentrations that are highly likely to be nontoxic to benthic organisms. The use of conservative SLVs to infer toxicity is expected to result in a large number of false positives (i.e., samples incorrectly classified as toxic). Estimates of probable effect concentrations, not threshold effect concentrations, are better predictors of sediment that may be toxic to benthic organisms (MacDonald et al., 2000). The DEQ Level II bioaccumulation SLVs for most metals appear to be very poor predictors of unacceptable sediment conditions. Many of the bioaccumulation SLVs for metals are below estimates of natural background concentrations in sediment. Bioaccumulation and toxicity of metals in nature is complex (USEPA, 2004), and the simple models used by the DEQ to estimate bioaccumulation SLVs for metals do not adequately account for several important determinants of metal toxicity such as bioavailability. Therefore, comparisons with SLVs are used as a screening step only, to be considered along with other information, to identify COIs that will be evaluated in TMP's stormwater.

4.1 COP M-1 Swan Island Basin Sediment Data

Freightliner's outfalls discharge to COP drainage basin M-1; Freightliner is one of over 40 facilities that discharge to this same outfall (COP, 2003). The Lower Willamette Group (LWG) is characterizing the nature and extent of contaminants in the Portland

Harbor as part of the Portland Harbor remedial investigation. As part of the LWG Round 2a sampling event, three surface sediment (0 to 30 centimeters below mudline) samples were collected near COP outfall M-1 to characterize sediment impacts in this portion of the Swan Island Basin (see Figure 4-1). The analytical data were validated by LWG and determined to be acceptable for use with associated qualifiers, where applicable. In addition, LWG assembled data generated by other parties (historical data). Fifteen historical surface sediment samples were collected within approximately 200 feet of outfall M-1 (see Figure 4-1). Table 4-1 summarizes the references for the historical sediment data.

Sediment analyses included SVOCs, chlorinated pesticides, polychlorinated biphenyls (PCBs), organophosphorus pesticides, and metals.

4.2 COP M-1 Drainage Basin Sediment Screening Results

Tables 4-2 through 4-5 present the sediment data in Swan Island Basin, adjacent to COP outfall M-1, and screen it against DEQ Level II SLVs.

Table 4-2 shows that the following metals were detected in one or more sediment samples at concentrations above SLVs and above the DEQ's background concentrations for sediment (DEQ, 2002): antimony, arsenic, cadmium, chromium, copper, lead, nickel, selenium, and zinc. It should be noted that only one of 18 samples collected near outfall M-1 exceeded SLVs for antimony and selenium. The antimony concentration exceeded the freshwater SLV by 0.05 milligrams per kilogram and is J flagged (i.e., the concentration is an estimate). The selenium concentration in a sample collected in 1997 exceeded the bioaccumulation SLV; in an LWG 2a surface sample collected within approximately 10 feet of this location in 2004, selenium was not detected at or above a method reporting limit (MRL) that was below the bioaccumulation SLV. Therefore, antimony and selenium are not considered COIs for outfall M-1.

Arsenic concentrations exceeded the toxicity SLV and background concentration in two of 18 samples. Arsenic concentrations in sediment appear to be within the expected range of natural background levels. Therefore, arsenic is not considered a COI.

Chromium, copper, zinc, cadmium, lead, and nickel exceeded background concentrations and toxicity and/or bioaccumulation SLVs in more than two samples.

Table 4-3 shows that polycyclic aromatic hydrocarbons (PAHs) were detected in one or more surface sediment samples at concentrations greater than their respective SLVs included the following: acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. The sum of high-molecular-weight PAHs was greater than the sum of low-molecular-weight PAHs.

Other SVOCs that were detected in sediment above their respective SLVs were bis(2-ethylhexyl)phthalate, dibutylphthalate, and phenol. Phenol was detected in two samples collected from one location in 1998. All subsequent samples collected in 2002 and 2004 were non-detect for phenol, indicating that phenol is no longer in sediment at concentrations above SLVs. Therefore, phenol is not considered a COI.

Table 4-4 shows that the chlorinated pesticides DDD, DDE, DDT, gamma-chlordane, and dieldrin were detected in one or more surface sediment samples at concentrations above their respective SLVs (Table 4-4). Table 4-5 shows that the PCB Aroclors 1242, 1248, and 1254 were detected in one or more sediment samples collected near outfall M-1 at concentrations that were above their respective SLVs (Table 4-5).

Organophosphorus pesticides were not detected in the sediment samples.

Based on sediment screening results, Table 4-6 includes preliminary sediment COIs for sediment near outfall M-1 and the M-1 drainage basin. Again, it is questionable whether some of the COI concentrations (e.g., PAHs) in sediment near the M-1 outfall may pose unacceptable risks to the environment due to the conservative SLVs used in the evaluation.

5 TMP STORMWATER CONCEPTUAL SITE MODEL AND CHEMICALS OF INTEREST

5.1 Stormwater Conceptual Site Model

As noted above, TMP on-site stormwater is routed to catch basins that discharge to the COP storm sewer system. Freightliner's stormwater discharge is then commingled with stormwater from the 40-plus facilities in the M-1 drainage basin, and ultimately discharged to Swan Island Basin via COP outfall M-1. The purpose of this evaluation is to determine if any chemicals used for site operations have the *potential* to be transported via stormwater runoff to on-site catch basins and, possibly, the Swan Island Basin.

As mentioned previously, the site is almost entirely covered by buildings or pavement. Surface soil is not exposed and therefore is not a potential source for impacts to the stormwater system.

5.2 Current Analytes for NPDES Stormwater-Monitoring Program

Stormwater monitoring has been conducted at the North Ensign Street and North Fathom Street outfalls since June 1993. With respect to the COIs identified in Table 4-6, Table 5-1 shows the results from the North Ensign outfall stormwater monitoring during that time span; the North Fathom outfall results are presented in Table 5-2. . Of the six metals identified in Table 4-6 as COIs near outfall M-1 in Swan Island Basin, Freightliner currently analyzes stormwater for three of them (copper, lead, and zinc), and historically, from 1993-97, it analyzed for the other three (cadmium, chromium and nickel) (analyses of these metals ceased in 1997 with the issuance of the current 1200Z permit, which did not include these parameters in the monitoring program).

Stormwater concentrations in Tables 5-1 and 5-2 are compared with the 1200-Z permit benchmarks and to the stormwater SLVs specified in Table 3-1 of the JSCS (JSCS stormwater SLVs), when available. Per the JSCS guidance, an exceedance of an SLV does not necessarily indicate that the source poses an unacceptable risk to human or ecological receptors; the SLVs are used to assess the priority for evaluating upland source control measures at a particular site (DEQ and USEPA, 2005).

Oil and grease concentrations did not exceed the benchmark value (10 milligrams per liter [mg/L]), except in samples collected during September 1994 (13 mg/L), March 1995 (11 mg/L), April 1995 (24 mg/L), and May 2000 (13 mg/L). Detected concentrations of oil and grease have decreased since monitoring began in June 1993, with no exceedances of the benchmark value since May 2000.

Detected concentrations of cadmium ranged from 0.0007 mg/L (October 1996) to 0.005 mg/L (September 1994), with average concentrations of 0.002 mg/L (Ensign Outfall) and 0.004 mg/L (Fathom Outfall). Cadmium concentrations decreased between 1993 and 1997. Analysis for cadmium ended in October 1997, as discussed above. Detected concentrations do not exceed the drinking water SLVs specified in Table 3-1 of the JSCS (0.005 mg/l), but do exceed the SLV specified for ecological risk (0.000094 mg/l).

Detected concentrations of chromium ranged from 0.001 mg/L (June 1993) to 0.054 mg/L (September 1994), with average concentrations of 0.013 mg/L (Ensign Outfall) and 0.008 mg/L (Fathom Outfall). Chromium concentrations slightly decreased between 1993 and 1997. Analysis for chromium ended in October 1997, as discussed above. Detected concentrations did not exceed the SLV specified in Table 3-1 of the JSCS.

Detected concentrations of copper ranged from 0.007 mg/L (March 2003) to 0.15 mg/L (June 1993), with average concentrations of 0.038 mg/L (Ensign Outfall) and 0.028 (Fathom Outfall). Detected concentrations of copper have decreased since monitoring began in June 1993. Detected concentrations have exceeded the permit benchmark on only one occasion (at North Ensign in 1993). Detected concentrations have never exceeded the drinking water SLV specified in Table 3-1 of the JSCS (1.3 mg/l), but have exceeded the SLV specified for ecological risk (0.0027 mg/l).

Detected concentrations of lead ranged from 0.00144 mg/L (May 2001) to 0.058 mg/L (October 1996), with an average concentrations of 0.008 mg/L (Ensign Outfall) and 0.014 mg/L (Fathom Outfalls). Detected concentrations of lead have been relatively stable since monitoring began in June 1993. Detected concentrations have never exceeded the permit benchmark (0.4 mg/l). Detected concentrations have exceeded the drinking water SLV specified in Table 3-1 of the JSCS (0.015 mg/l) and the SLV specified for ecological risk (0.00054 mg/l).

Detected concentrations of nickel ranged from 0.0038 mg/L (October 1996) to 0.011 mg/L (November 1995), with average concentrations of 0.009 mg/L (Ensign Outfall) and 0.01 mg/L (Fathom Outfall). Nickel concentrations were relatively stable between 1993 and 1997. Analysis for nickel ended in October 1997, as discussed above. Detected concentrations never exceeded any of the SLVs specified in Table 3-1 of the JSCS.

Detected concentrations of zinc ranged from 0.08 mg/L (March 1995, October 1995, and October 1996) to 1.45 mg/L (January 1998), with average concentrations of 0.375 mg/L (Ensign Outfall) and 0.470 (Fathom Outfall). Detected concentrations of zinc vary

seasonally and have increased slightly since monitoring began in June 1993. As reported in *Stormwater and Best Management Practices: Review and Assessment (*MFA, 2004), Freightliner has addressed the occasional exceedance of the permit benchmark with additional BMPs. Since completion of those BMPs in 2005 (particularly, the neoprene coating of the galvanized roof, which was completed in October 2005, the permit benchmark (0.6 mg/l) has not been exceeded. Detected concentrations have never exceeded the SLVs specified in Table 3-1 of the JSCS for drinking water (5 mg/L) or for human health (26 mg/L), but did exceed the SLV for ecological risk (0.36 mg/L).

5.3 Selection of Site-Related Stormwater COIs

The following section discusses site-related stormwater COIs that require monitoring because the chemical was detected in site stormwater above the SLVs presented in Table 3-1 of the JSCS (DEQ and USEPA, 2005). If a chemical is currently not monitored in stormwater, it was selected as a site-related COI if it is currently used on site, could accidentally be discharged to the on-site stormwater system, and was identified as a COI in sediment near COP outfall M-1 or if the analysis was requested by DEQ.

5.3.1 Metals

The TMP has been used copper in various pigments in its operations; its usage, however, has been within buildings. Copper concentrations have exceeded the SLV for ecological risk presented in Table 3-1 of the JSCS; therefore, copper is considered a site-related COI in stormwater.

The TMP has used chromium since operations began in December 1969. Top-coat paint and some primers contained pigments that included chromium until about 1995. Chromium is currently used in the chrome phosphate process prior to E-coating. All usage has been within buildings. Chromium concentrations in Freightliner's stormwater have not exceeded the SLVs presented in Table 3-1 of the JSCS; therefore, chromium is not considered a site-related COI in stormwater. DEQ is concerned about hexavalent chromium and has requested that this metal be retained as a COI for stormwater.

The TMP does not currently use nickel, or is any historical use of nickel known. Nickel concentrations have not exceeded any of the SLVs specified in Table 3-1 of the JSCS; therefore, nickel is not considered a site-related COI in stormwater.

The TMP used top-coat pigments that contained zinc up until the early 1980s. The TMP started using zinc again in October 2002 in the zinc-phosphating of steel cabs for the production of Western Star Trucks tractors. All usage is contained in buildings. Freightliner has experienced modest exceedances of the zinc SLV for ecological risk presented in Table 3-1 of the JSCS. These exceedances are likely due to leaching from

the galvanized metal of the plant building; leaching of zinc from galvanized-metal buildings is a common occurrence. Freightliner has been addressing zinc exceedances through BMPs pursuant to its 1200Z general stormwater permit, most recently by completing the neoprene sealing of its galvanized roofs, and will continue to address that potential pathway (see Table 3-2). Stormwater is currently analyzed for zinc.

Cadmium and lead have not been identified as ingredients in products used at the TMP. Detected concentrations of both cadmium and lead have exceeded the SLVs presented in Table 3-1 of the JSCS. The source of these metals in stormwater is unclear. Stormwater is currently analyzed for lead pursuant to its 1200Z general stormwater permit. Freightliner has no known source of these materials, but lead will be retained as a COI at the request of DEQ.

5.3.2 PAHs

PAHs are constituents of diesel-range petroleum hydrocarbons. Diesel is used on site, but is also likely present in stormwater runoff throughout the M-1 drainage basin. As noted above, the monitoring of oil and grease has been conducted as part of the stormwater permit. Oil and grease concentrations did not exceed the benchmark value, except in samples collected during September 1994 (13 mg/L), March 1995 (11 mg/L), April 1995 (24 mg/L), and May 2000 (13 mg/L); and detected concentrations of oil and grease have decreased since monitoring began in June 1993, with no exceedances of the benchmark value since May 2000. The COP storm lines in drainage basin M-1 drain public right-of-ways in a high-traffic industrial and commercial area. Vehicle traffic and streets have been found to be sources for many of the COIs identified in sediment near COP outfall M-1. For example, PAH sources include lubricating oils, tire particles, automobile exhaust, erosion of road surfaces (asphalt), and parking lot sealants (Mahler et al., 2005). In addition, PAHs are present in sediment near most COP outfalls in the Portland Harbor Portland Harbor. However, because diesel and other petroleum products are used on site, PAHs are considered site-related stormwater COIs.

5.3.3 Phthalates

Freightliner does not appear to be a potential source of the phthalates of concern. The only known phthalate used by Freightliner in its operations was butylbenzylphthalate, which was contained in a primer used during the 1970s and discontinued thereafter. *Focused Preliminary Assessment* for the TMP (Exponent, 2001). All operations associated with this primer were indoors. The phthalates (bis[2-ethylhexyl]phthalate and di-n-butyl phthalate) identified in Table 4-6 are different from the phthalate that Freightliner used. Note that phthalates appear to be ubiquitous in the Portland Harbor Portland Harbor near COP outfalls and are known to be common constituents in stormwater runoff. As noted above, vehicle traffic and streets are likely sources for many

of the COIs identified in sediment near COP outfall M-1, including the phthalates; phthalate sources include tire and rubber wear particles, lubricants, and particles from the degradation of many plastics. However, at DEQ's request, phthalates will be retained as a COI.

5.3.4 Pesticides

There are no known sources of the chlorinated pesticides DDD, DDT, DDE, gamma-chlordane, or dieldrin at the Freightliner site. Most of these pesticides were banned for use in the United States decades ago. Because the site has not been used for agricultural purposes, it is unlikely that these pesticides were applied to upland areas at or near the site. Also, in the unlikely event that pesticides were present in soil at the site, the site is now covered with pavement or buildings, and therefore no significant pathways exist for chemicals in soil to enter the stormwater system. These pesticides are not considered site-related stormwater COIs.

5.3.5 PCBs

With respect to PCBs, according to Freightliner, no known transformers or light ballasts that contained/contain PCBs were or are present at the TMP. PCBs have been banned for use in the United States for over 20 years. Therefore, PCB detections (Aroclors 1242, 1248 and 1254) in sediment near COP outfall M-1 are likely from sources other than Freightliner. There are no current sources of PCBs, and no significant pathway for soil particles to enter stormwater because the site is paved and covered with buildings. However, at DEQ's request, PCBs will be retained as a COI.

5.3.6 Summary of COIs for Stormwater

In summary, the following chemicals/elements are considered stormwater COIs for the Freightliner TMP SWE:

- PAHs
- Phthalates
- PCBs (Aroclors 1242, 1248 and 1254)
- Copper
- Hexavalent chromium
- Lead
- Zinc

Stormwater is currently analyzed for oil and grease, copper, lead and zinc.

6 SCOPE OF WORK

The JSCS suggests sampling catch basin sediment before stormwater screening "so that analytical results from the catch basin screening can be used to refine the site-specific stormwater analytical suite." As described above, catch basin inserts are used in all of the catch basins and are inspected monthly and replaced quarterly or more frequently, if needed. Catch basin sediment is removed about every other month. Therefore, sediment is not expected to significantly accumulate in the stormwater system. However, at the request of DEQ, a sample of solids cleaned out of the stormwater system will be analyzed for PAHs, phthalates, PCBs, copper, lead and zinc.

Note that detections of chemicals in stormwater more accurately represent what is transported and discharged to the river than sediments retained in catch basins. Therefore, stormwater samples will be collected and analyzed for the stormwater COIs: PAHs, phthalates, PCBs, copper, hexavalent chromium, lead and zinc.

On-site stormwater lines to the North Fathom and North Ensign street outfalls will be cleaned. Stormwater samples will be collected at the outfalls before and after the stormwater lines are cleaned. As noted above, a sample of the material cleaned out of the lines also will be collected for analyses. The stormwater line cleanout procedure and stormwater sampling analyses are described in greater detail below.

6.1 Stormwater Sampling and Analyses

Stormwater will be collected and analyzed to evaluate the potential for site-related contaminants to impact the Willamette River via the stormwater pathway. Stormwater will be collected at the North Ensign Street and North Fathom Street outfalls, where stormwater is currently monitored for the NPDES permit.

Up to four separate storm events will be sampled for screening purposes. One of these events will take place before the stormwater line cleanout within the first 30 minutes of stormwater discharge (i.e., first-flush conditions). A second event will take place after the stormwater line cleanout during first-flush conditions. Two additional sampling events may be conducted after the stormwater line cleanout within the first three hours of stormwater discharge, depending on the results of the pre- and post-cleanout sampling. Storm event criteria, according to the JSCS, are as follows:

- Antecedent dry period of at least 24 hours (<0.1" rainfall)
- Minimum predicted rainfall volume of >0.2" per event
- Expected duration of storm event of at least three hours

6.1.1 Sampling Methods

Grab samples will be collected as described in stormwater sampling guide (Ecology, 2002) included in Appendix D of the JSCS (DEQ and USEPA, 2005). Grab samples will be collected directly into laboratory-supplied bottles. The bottles will be held with their openings facing upstream. Care will be taken to avoid contaminating the sample by touching the opening of the container and ensuring that the stormwater enters the bottle directly. For a well-mixed, representative sample, the samples will be taken from a central portion of the stormwater flow and where there is a moderate flow and some turbulence. Bottles will not be overfilled and will be capped as soon as they are full. Field parameters (pH, specific conductance, temperature and turbidity) will be measured during sample collection.

6.1.2 Analyses

The stormwater will be analyzed for the following parameters: total metals (copper, lead and zinc) by USEPA Method 6020 (USEPA, 1986), hexavalent chromium by USEPA Method 7196, PAHs by USEPA Method 8270 selective ion monitoring, phthalates by USEPA Method 8270, and PCBs (Aroclors 1242, 1248 and 1254) by USEPA Method 8082. Analyses and data quality objectives are summarized in Table 6-1, and container and holding times are specified in Table 6-2. MFA will attempt to achieve MRLs that are less than the JSCS SLVs for stormwater (see Table 6-3); if the MRLs are not analytically achievable, MFA will document the alternative Practical Quantification Limit, as set forth in section 3.3 of the JSCS.

6.1.3 Documentation

The following information will be recorded in a field notebook at the time of sample collection:

- What time rainfall began and when runoff was first observed at the sampling location
- Number of dry days before the day the sample was collected
- Inches of rain during a 24-hour period
- Time and date of sampling

- How the sample was collected and any problems that occurred during collection
- Visual sample observations
- Evidence of contamination, e.g., odor, sheen, discoloration of water

6.1.4 Sample Transport and COC Procedures

After sample containers have been filled, they will be packed on blue ice in coolers and transported to the analytical laboratory. Chain-of-custody (COC) procedures will begin in the field and will track delivery of the samples to laboratories. Specific procedures are as follows:

- Individual sample containers will be packed to prevent breakage.
- A sealed envelope containing COC forms will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- Signed and dated COC seals will be placed on all coolers before shipping.

Upon transfer of samples to the laboratory, the COC form will be signed by the persons transferring custody of the coolers. Upon receipt of samples at the laboratory, the shipping-container seal will be broken and the condition of the samples will be recorded by the receiver.

6.1.5 Data Evaluation

Data will undergo a quality assurance review consistent with USEPA protocols (USEPA, 1994 and 1999). Stormwater data will be compared with the JSCS water SLVs (Table 3-1 of DEQ and USEPA, 2005). If chemical concentrations of the first-flush sampling conducted before the stormwater system cleanout are below the SLVs, these chemicals or elements will not be recommended for further evaluation during subsequent sampling.

6.1.6 Schedule

Current plans are to conduct the stormwater sampling as soon as practical following DEQ approval of this work plan. The DEQ will be notified a minimum of five working days before the fieldwork begins.

6.2 Stormwater System Cleanout

After one first-flush stormwater sampling event has been conducted, Freightliner will contract with West Coast Marine Cleaning, Inc. (WCMC) of Vancouver, Washington, to clean out the on-site stormwater lines to the North Fathom and North Ensign street outfalls. The cleanout procedure will involve the following actions: expanding packers at the outfalls on North Fathom and North Ensign streets to prevent possible discharge of water and solids into the municipal system; inserting an 8-inch-diameter vacuum line with a 1-inch-diameter jetting head from the origin of the storm system to the first catch basin to dislodge solids, using jetted water; retracting the line and vacuuming water and solids into a decontaminated vacuum truck or roll-off box; repeating the procedure in the line between each catch basin; collecting a grab sample of the material removed from the lines from the vacuum truck or roll-off box for analyses; and disposing of the solids at a permitted landfill with Waste Management's approval and water in a permitted treatment facility at WCMC. The solids sample will be analyzed for metals by the Toxicity Characteristic Leaching Procedure (if required by Waste Management), total metals (copper, lead and zinc) by USEPA Method 6020 (USEPA, 1986), PAHs by USEPA Method 8270 selective ion monitoring, phthalates by USEPA Method 8270, and PCBs (Aroclors 1242, 1248 and 1254) by USEPA Method 8082. Analyses and data quality objectives are summarized in Table 6-1, and container and holding times are specified in Table 6-2. Solids data will be compared to the JSCS stormwater sediment SLVs (Table 3-1 of DEQ and USEPA, 2005). The results of the cleanout will be documented in the stormwater report.

7 REPORTING

After receipt of the pre-cleanout stormwater results, Freightliner will notify DEQ to discuss the results and the recommended analyte list for the post-cleanout samples. After the post-cleanout stormwater sampling event(s) have been conducted, a SWE report will be submitted. The report will describe the sampling and analytical results of stormwater sampling and the system cleanout. Stormwater analytical results will be compared with the JSCS SLVs for stormwater (Table 3-1, DEQ and USEPA, 2005). Any contaminant sources requiring additional BMPs or controls will be identified, and a recommendation for additional monitoring will be made, if necessary.

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

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TABLES

Table Notes
Sediment Adjacent to COP M-1 Outfall
Swan Island Basin
Portland, Oregon

Bold values indicate exceedance of a screening level value and background value.

Shaded values indicate exceedance of the NPDES permit benchmark.

-- = Not analyzed.

% = percent.

A = detected quantities of analytes added together as defined in WAC 173-204-320 for low-molecular-weight polycyclic aromatic hydrocarbons and high-molecular-weight polycyclic aromatic hydrocarbons.

AST = aboveground storage tank.

B = possible method blank contamination.

BMP = best management practice.

cm bml = centimeters below mudline.

COI = chemical of interest.

°C = degrees Celsius.

DEQ Level II SLVs = Oregon Department of Environmental Quality Guidance for Ecological Risk Assessment screening level values (DEQ, 2005).

E = estimate, usually applied because the value exceeded the instrument calibration range.

ERT = Emergency Response Team.

G = estimate is greater than the value shown.

GC = gas chromatography.

HDPE = high density polyethylene.

HPAH = high-molecular-weight polycyclic aromatic hydrocarbons.

ICP = inductively-coupled plasma.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JSCS = Joint Source Control Strategy (DEQ and USEPA, 2005)

LPAH = low-molecular-weight polycyclic aromatic hydrocarbons.

mg/kg = milligrams per kilogram.

mg/L = milligrams per liter.

ml = milliliter.

MRL = method reporting limit.

MS = mass spectrometry.

µg/kg = micrograms per kilogram.

µg/L = micrograms per liter.

N = presumptive evidence of presence of material.

NA = not available.

NPDES = National Pollutant Discharge Elimination System.

NV = no value.

Table Notes
Sediment Adjacent to COP M-1 Outfall
Swan Island Basin
Portland, Oregon

O&M = operation and maintenance.

oz. = ounces.

P = Gas/High Performance Liquid Chromatograph criteria exceeded relative percent difference >40% (>25% chlorinated pesticides).

PAH = polycyclic aromatic hydrocarbon.

PCB = polychlorinated biphenyl.

PM = project management.

RCRA = Resource Conservation and Recovery Act.

SIM = selective ion monitoring.

SLV = screening level value

SU = standard units.

SVOC = semivolatile organic compound.

SWPCP = stormwater pollution control plan.

U = not detected at or above MRLs.

UJ = not detected at or above the MRL. The MRL is an estimated value.

[1]SLV for total chlordane.

[2]Stormwater samples were not collected at the Ensign outfall in August 2004.

[3]Quality assurance/quality control limits for recovery and relative percent difference vary for each analyte and are specified in SW-846 for each analytical method.

Table 3-1
Operational Best Management Practices
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Operational Control/BMP	Frequency	Responsibility	Documentation of Performance
Forklift maintenance conducted indoors	Continuous	Maintenance	None
Drip pans or other containment in use to contain equipment leaks or leaks from trucks	Continuous	Maintenance & offline	None
Lid on crushed drum drop box	Continuous	Maintenance	Weekly RCRA inspection
Steam cleaning/water blasting limited to wash-pad area	Continuous	All Staff	None
Sealed boxes used for collecting recyclable scrap metals	Continuous	Metal Recycler (Calbag)	None
Used oil and antifreeze collection points inside building	Continuous	Maintenance	None
Catch basin inserts used in all storm drains	Continuous	Maintenance	SWPCP monthly inspection form
Accurate storm-sewer drainage and piping layouts maintained	Continuous	Facilities Engineering Manager	Updated plans on file
Spill-containment pallets in use under totes of liquids outside of secondary-containment structures	Continuous	Maintenance	Currently not on checklist. To be added.
"Drains to stream" fish stencils at storm drains to warn against dumping	Continuous	Environmental Engineer	SWPCP monthly inspection form
Storm drain covers provided in all ERT carts	Continuous	Safety Manager	Monthly checklist
Catch basins cleaned on a quarterly basis	Continuous	Environmental Engineer	Quarterly PM schedule and documentation
Accessible areas swept with a sweeper weekly	Continuous	Facilities Engineering Manager	None
Oil/water separators cleaned bimonthly	Continuous	Environmental Engineer	None
Site entirely paved	Continuous	Facilities Engineering Manager	None
Stormwater outfall discharges inspected for color, foam, sheen, and other visible evidence of potential problems	Continuous	Maintenance	PM schedule and documentation
Precipitation collected in containment inspected for color, sheen, pH as necessary prior to discharge	Continuous	Maintenance	Log book for draining containment
Employees trained regarding stormwater pollution prevention and spill response	Annual refresher	Environmental Engineer	Training documentation
On-site ERT	Continuous	Safety Manager	None
Stormwater pollution prevention procedures reviewed and revised as necessary	Annual review or as needed	Environmental Engineer	SWPCP documentation
Existing pavement maintained to minimize erosion	As needed	Facilities Engineering Manager	None
Dry cleanup methods (e.g., absorbent) used for spilled or leaked liquids in areas of use or storage	As needed	First Responder	Only if reportable spill

Table 3-1
Operational Best Management Practices
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Operational Control/BMP	Frequency	Responsibility	Documentation of Performance
Dust controlled by maintaining clean pavement and posting speed limits	As needed	Not applicable	None
Preventive maintenance scheduled for all forklifts	Monthly	Maintenance	PM documentation
Vacuum truck (300-gallon capacity) purchased for ERT to use on spills	As needed	Safety Manager	None
Drum covers used on product drums stored outside	As needed	Maintenance	None

Table 3-2
Structural Best Management Practices
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Structural Control/BMP	Date Installed	O&M requirements	O&M responsibility
Standard trap catch basins (2'x 2'x 2').	1969	Inspected monthly, cleaned quarterly.	Environmental Engineer
Environmental Center building used for storing chemicals and accumulating waste is secondary-containment building (concrete bermed with blind sump). Asphalt on northeast and northwest sides slopes toward building (1993).	1993	Inspected weekly during RCRA inspection.	Maintenance
Tank-farm containment designed with chemical-resistant epoxy coating, oil/water separator, and locked discharge valve. Fill/dispense locations under cover, in containment (2003).	2003	Inspected weekly during RCRA inspection.	Maintenance
Used-oil tank inside containment (circa 1986) and under cover (2003).	1986 and 2003	Inspected weekly during RCRA inspection.	Maintenance
Diesel-dispense areas use primary containment for nozzle (metal trough), and secondary containment is present beneath dispense nozzle.	1986 (former AST farm); 2004 (current AST farm)	Currently not on inspection sheet. To be added.	Maintenance
Covered antifreeze tank and tire shop (1997).	1997	Not applicable.	Not applicable
Oil/water separators at tank farm, compactors, and forklift-repair/wash-pad area.	2003, 1995, 1999 (respectively)	Pumped bimonthly.	Environmental Engineer
Wash-pad area has asphalt containment, and steam-clean area has enclosure. Area drains to sanitary sewer.	1999	Maintain as necessary.	Not applicable
Building added for plastic-parts wash (2000).	2000	Maintain as necessary.	Maintenance
Constructed indoor used-oil and -antifreeze collection points for offline and Pool 3 (2000).	2000	Maintain as necessary.	Maintenance
Installed StormFilter with leaf-compost media for soluble metals at Ensign Street outfall (2003).	2003	Nine-month maintenance by manufacturer. Remove sediment on a quarterly basis.	Maintenance
Installed asphalt on northeast part of site (2003).	2003	Not applicable.	Not applicable
Covered used-oil AST (2003).	2003	Not applicable.	Not applicable
Bioswale installed for new truck-parking area (offline yard) (2002/2003).	2003	Maintain as necessary.	Environmental Engineer
Installed new stall area for truck parking that includes oil/water separator (offline yard) (2004).	2004	Maintain as necessary; pump oil/water separator bimonthly.	Maintenance
Enclosure built at offline truck entry (chains 1 and 2) (2004).	2004	Not applicable.	Not applicable
Five-Year Plan for roof replacement with Neogard™.	2002–2005	Annual and five-year inspections.	Facilities Engineering Manager

Table 4-1
Sediment Data References
Sediment Adjacent to COP M-1 Outfall
Swan Island Basin
Portland, Oregon

Sample Location	Sample ID	Reference Title	Reference Source
G380	LW2-G380	Round 2a surface sediment sampling	Lower Willamette Group
G383	LW2-G383	Round 2a surface sediment sampling	Lower Willamette Group
G388	LW2-G388	Round 2a surface sediment sampling	Lower Willamette Group
PSYSEA98PSY08	PSY08S	PSY Sediment Investigation Data Report	Striplin Environmental Associates, Inc., 1998
	PSY51S	PSY Sediment Investigation Data Report	Striplin Environmental Associates, Inc., 1998
	PSY52S	PSY Sediment Investigation Data Report	Striplin Environmental Associates, Inc., 1998
	PSY53S	PSY Sediment Investigation Data Report	Striplin Environmental Associates, Inc., 1998
WLCOFH02M101	PP01M101	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M101	PP01M102D	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M103	PP01M103	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M104	PP01M104	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M105	PP01M105	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M106	PP01M106	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M107	PP01M107	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M108	PP01M108	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M109	PP01M109	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WLCOFH02M110	PP01M110	City of Portland Outfall Pilot Project	CH2M Hill, 2002
WR-WSI98SD136	SD1360	Portland Harbor Sediment Investigation Report Multnomah County, Oregon	Roy F. Weston, Inc., 1998

Table 4-2
Metals in Sediment Adjacent to COP M-1 Outfall (mg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium
DEQ Level II SLVs—Bioaccumulation				NA	10	NA	NA	122	0.003	NA
DEQ Level II SLVs—Toxicity				NA	3	6	NA	NA	0.6	NA
Background				NA	1	7.9	NA	NA	<0.5	NA
G380	LW2-G380	22	10/22/2004	14300	0.58 J	**8.44**	NA	NA	0.422	NA
G383	LW2-G383	20	10/08/2004	5060	0.36 J	1.52 J	NA	NA	0.422	NA
G388	LW2-G388	26	09/09/2004	11000	0.23 J	1.77 J	NA	NA	0.229	NA
WLCOFH02M101	PP01M101	15	08/22/2002	7890	1.33 J	7.61	NA	NA	**1.64**	NA
WLCOFH02M103	PP01M103	15	08/22/2002	12000	1.16 J	5.81	NA	NA	**1.31**	NA
WLCOFH02M104	PP01M104	15	08/22/2002	4820	0.388 J	3.86	NA	NA	0.348 J	NA
WLCOFH02M105	PP01M105	15	08/22/2002	3560	1.15 J	4.11	NA	NA	**1.89**	NA
WLCOFH02M106	PP01M106	15	08/22/2002	5310	1.83 J	4.1	NA	NA	**1.26**	NA
WLCOFH02M107	PP01M107	15	08/22/2002	5430	0.338 J	2.81	NA	NA	0.00927 U	NA
WLCOFH02M108	PP01M108	15	08/22/2002	8120	0.452 J	**8.98**	NA	NA	0.00947 U	NA
WLCOFH02M109	PP01M109	15	08/22/2002	9030	0.594 J	4.84	NA	NA	0.488 J	NA
WLCOFH02M110	PP01M110	15	08/22/2002	5130	0.281 J	3.65	NA	NA	0.18 J	NA
	PP01M102D	15	08/22/2002	6690	**3.05 J**	4.25	NA	NA	**1.52**	NA
PSYSEA98PSY08	PSY08S	10	04/07/1998	NA	0.1 G	6	NA	NA	**2.3**	NA
	PSY51S	10	04/07/1998	NA	0.1 G	7	NA	NA	**2.2**	NA
	PSY52S	10	04/07/1998	NA	0.2 G	6	NA	NA	**2.8**	NA
	PSY53S	10	04/07/1998	NA	0.2 G	5	NA	NA	**1.5**	NA
WR-WSI98SD136	SD1360	10	09/22/1997	15400	7 UJ	7 U	138	0.3	1	6310 J

DTNA 000098

Table 4-2
Metals in Sediment Adjacent to COP M-1 Outfall (mg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury
DEQ Level II SLVs—Bioaccumulation				4200	10	NA	128	NA	NA	NA
DEQ Level II SLVs—Toxicity				37	36	NA	35	NA	1100	0.2
Background				30	12	NA	2	NA	NA	0.2
G380	LW2-G380	22	10/22/2004	25.8	**170**	NA	22.7	NA	NA	0.049
G383	LW2-G383	20	10/08/2004	**128**	**33.8**	NA	10.3 J	NA	NA	0.032
G388	LW2-G388	26	09/09/2004	26.2	**20.4**	NA	23.3	NA	NA	0.057
WLCOFH02M101	PP01M101	15	08/22/2002	**45**	**86.5 B**	NA	**48.2 B**	NA	NA	0.125
WLCOFH02M103	PP01M103	15	08/22/2002	**39.9**	**79.9 B**	NA	**43.4 B**	NA	NA	0.131
WLCOFH02M104	PP01M104	15	08/22/2002	**148**	**25.6 B**	NA	34 B	NA	NA	0.0104 U
WLCOFH02M105	PP01M105	15	08/22/2002	31.5	**73.6 B**	NA	**57.6 B**	NA	NA	0.108
WLCOFH02M106	PP01M106	15	08/22/2002	**89.2**	**49.5 B**	NA	**38.6 B**	NA	NA	0.0102 U
WLCOFH02M107	PP01M107	15	08/22/2002	11.1	**15 B**	NA	5.45 B	NA	NA	0.0103 U
WLCOFH02M108	PP01M108	15	08/22/2002	20.9	**34.4 B**	NA	14.6 B	NA	NA	0.0118 U
WLCOFH02M109	PP01M109	15	08/22/2002	34.7	**63.8 B**	NA	24.6 B	NA	NA	0.0124 U
WLCOFH02M110	PP01M110	15	08/22/2002	20.4	**36 B**	NA	10.8 B	NA	NA	0.0111 U
	PP01M102D	15	08/22/2002	**146**	**72.5 B**	NA	**114 B**	NA	NA	0.124
PSYSEA98PSY08	PSY08S	10	04/07/1998	**41 E**	**82.3**	NA	**41.5 EG**	NA	NA	0.14
	PSY51S	10	04/07/1998	**43 E**	**81.7**	NA	**55.3 EG**	NA	NA	0.08
	PSY52S	10	04/07/1998	**43 E**	**42.6**	NA	**55.8 EG**	NA	NA	0.12
	PSY53S	10	04/07/1998	**52 E**	**66.6**	NA	**36.6 EG**	NA	NA	0.08
WR-WSI98SD136	SD1360	10	09/22/1997	24.6	**81.5**	37900	24	4090	323	0.06

Table 4-2
Metals in Sediment Adjacent to COP M-1 Outfall (mg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
DEQ Level II SLVs—Bioaccumulation				316	NA	0.1	NA	NA	NA	NA	3
DEQ Level II SLVs—Toxicity				18	NA	NA	4.5	NA	NA	NA	123
Background				20	NA	0.4	NA	NA	NA	NA	53
G380	LW2-G380	22	10/22/2004	17	NA	0.08 U	0.173	NA	NA	NA	**203**
G383	LW2-G383	20	10/08/2004	9.2	NA	0.05 U	0.097	NA	NA	NA	**173**
G388	LW2-G388	26	09/09/2004	16.8	NA	0.05 U	0.047	NA	NA	NA	**95.3**
WLCOFH02M101	PP01M101	15	08/22/2002	**20.4 B**	NA	0.603 U	0.249 J	NA	NA	NA	**403 B**
WLCOFH02M103	PP01M103	15	08/22/2002	**23.6 B**	NA	0.574 U	0.248 J	NA	NA	NA	**318 B**
WLCOFH02M104	PP01M104	15	08/22/2002	14.1 B	NA	0.46 U	0.0239 J	NA	NA	NA	**359 B**
WLCOFH02M105	PP01M105	15	08/22/2002	17.3 B	NA	0.547 U	0.0654 J	NA	NA	NA	**362 B**
WLCOFH02M106	PP01M106	15	08/22/2002	17.2 B	NA	0.498 U	0.0855 J	NA	NA	NA	**357 B**
WLCOFH02M107	PP01M107	15	08/22/2002	11.4 B	NA	0.502 U	0.017 J	NA	NA	NA	**57 B**
WLCOFH02M108	PP01M108	15	08/22/2002	14.6 B	NA	0.513 U	0.112 J	NA	NA	NA	**145 B**
WLCOFH02M109	PP01M109	15	08/22/2002	**22.5 B**	NA	0.581 U	0.115 J	NA	NA	NA	**193 B**
WLCOFH02M110	PP01M110	15	08/22/2002	17.3 B	NA	0.424 U	0.0298 J	NA	NA	NA	**123 B**
	PP01M102D	15	08/22/2002	**21.3 B**	NA	0.553 U	0.161 J	NA	NA	NA	**577 B**
PSYSEA98PSY08	PSY08S	10	04/07/1998	**25**	NA	NA	0.2	NA	NA	NA	**333 E**
	PSY51S	10	04/07/1998	**22**	NA	NA	0.3	NA	NA	NA	**330 E**
	PSY52S	10	04/07/1998	**22**	NA	NA	0.4	NA	NA	NA	**424 E**
	PSY53S	10	04/07/1998	17	NA	NA	0.2	NA	NA	NA	**322 E**
WR-WSI98SD136	SD1360	10	09/22/1997	20	570	**10**	0.9	763	7 U	68.6	**178**

DTNA 000100

Table 4-3
Semivolatile Organic Compounds in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	2-Methyl-naphthalene	4-Chloro-3-methylphenol	4-Methylphenol	Acenaphthene	Acenaphthylene	Aniline	Anthracene
DEQ Level II SLVs—Bioaccumulation				NA	NA	NA	NA	NA	NA	NA
DEQ Level II SLVs—Toxicity				NA	NA	NA	290	160	NA	57
G380	LW2-G380	22	10/22/2004	36	6.1 U	8.6 J	200	57	4.4 U	**290**
G383	LW2-G383	20	10/08/2004	5.9	5.3 UJ	7.3 UJ	3.5	1.6 J	3.8 UJ	7.5
G388	LW2-G388	26	09/09/2004	2.4 J	3 UJ	4.1 UJ	1.6 J	1.9 J	2.1 UJ	5.8
WLCOFH02M101	PP01M101	15	08/22/2002	35.1 UJ	247 UJ	333 UJ	111 UJ	98 UJ	1120 UJ	56.6 UJ
WLCOFH02M103	PP01M103	15	08/22/2002	32.3 UJ	228 UJ	306 UJ	102 UJ	90.2 UJ	1030 UJ	**67.9 J**
WLCOFH02M104	PP01M104	15	08/22/2002	2.66 U	18.8 U	25.3 U	8.46 U	7.45 U	85.4 U	6.15 J
WLCOFH02M105	PP01M105	15	08/22/2002	27.8 UJ	196 UJ	264 UJ	108 J	77.7 UJ	891 UJ	**137 J**
WLCOFH02M106	PP01M106	15	08/22/2002	26.6 UJ	188 UJ	252 UJ	84.4 UJ	74.3 UJ	852 UJ	**102 J**
WLCOFH02M107	PP01M107	15	08/22/2002	2.6 U	18.4 U	24.7 U	8.26 U	7.28 U	83.4 U	4.97 J
WLCOFH02M108	PP01M108	15	08/22/2002	9.42 J	20.8 U	28 U	26.7	21.3	94.4 J	36.1
WLCOFH02M109	PP01M109	15	08/22/2002	15.4 J	29.8 J	68 J	20.2	18.6 J	98.5 U	17.3 J
WLCOFH02M110	PP01M110	15	08/22/2002	2.49 U	17.6 U	23.6 U	7.9 U	10.7 J	79.8 U	12.1 J
	PP01M102D	15	08/22/2002	29.9 UJ	211 UJ	284 UJ	94.8 UJ	97.2 J	958 UJ	**101 J**
PSYSEA98PSY08	PSY08S	10	04/07/1998	13	50 U	100 U	23	13	NA	52
	PSY51S	10	04/07/1998	55	50 U	100 U	31 U	**438**	NA	**308**
	PSY52S	10	04/07/1998	22	50 U	100 U	36	13	NA	**86**
	PSY53S	10	04/07/1998	21	50 U	100 U	27	10 U	NA	36
WR-WSI98SD136	SD1360	10	09/22/1997	19 U	38 U	380	19 U	19 U	NA	19

Table 4-3
Semivolatile Organic Compounds in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Benzo(a)-Anthracene	Benzo(a)-Pyrene	Benzo(b)-Fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-Fluoranthene	Benzo-fluoranthenes
DEQ Level II SLVs—Bioaccumulation				NA	100	NA	NA	NA	NA
DEQ Level II SLVs—Toxicity				32	32	NA	300	27	NA
G380	LW2-G380	22	10/22/2004	**790**	**400**	620	230	**190**	NA
G383	LW2-G383	20	10/08/2004	**35**	**37**	62	46	17	NA
G388	LW2-G388	26	09/09/2004	22	25	34	20	11	NA
WLCOFH02M101	PP01M101	15	08/22/2002	137 UJ	132 UJ	NA	37.1 UJ	NA	98.9 UJ
WLCOFH02M103	PP01M103	15	08/22/2002	126 UJ	121 UJ	NA	34.1 UJ	NA	581 J
WLCOFH02M104	PP01M104	15	08/22/2002	10.4 U	10 U	NA	2.82 U	NA	35.7
WLCOFH02M105	PP01M105	15	08/22/2002	109 UJ	105 UJ	NA	29.4 UJ	NA	78.4 UJ
WLCOFH02M106	PP01M106	15	08/22/2002	**308 J**	100 UJ	NA	28.1 UJ	NA	716 J
WLCOFH02M107	PP01M107	15	08/22/2002	10.2 U	9.8 U	NA	2.75 U	NA	7.34 U
WLCOFH02M108	PP01M108	15	08/22/2002	**150**	**136**	NA	130	NA	262
WLCOFH02M109	PP01M109	15	08/22/2002	**148**	**114**	NA	105	NA	229
WLCOFH02M110	PP01M110	15	08/22/2002	**57.3**	9.37 U	NA	2.63 U	NA	92.3
	PP01M102D	15	08/22/2002	117 UJ	112 UJ	NA	31.6 UJ	NA	84.3 UJ
PSYSEA98PSY08	PSY08S	10	04/07/1998	**288**	**223**	350	164	**267**	NA
	PSY51S	10	04/07/1998	**870**	**1200**	949	**899**	**798**	NA
	PSY52S	10	04/07/1998	**388**	**364**	694	**336**	**416**	NA
	PSY53S	10	04/07/1998	**211**	**206**	313	195	**234**	NA
WR-WSI98SD136	SD1360	10	09/22/1997	**69**	**85**	110	49	**74**	NA

Table 4-3
Semivolatile Organic Compounds in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Benzoic Acid	Bis(2-Ethylhexyl)phthalate	Butylbenzyl Phthalate	Carbazole	Chrysene	Dibenz(a,h)-anthracene	Dibenzo-furan
DEQ Level II SLVs—Bioaccumulation				NA	330	NA	NA	NA	NA	NA
DEQ Level II SLVs—Toxicity				NA	750	NA	140	57	33	5100
G380	LW2-G380	22	10/22/2004	280 U	**1700**	55	36	**840**	48	16
G383	LW2-G383	20	10/08/2004	250 UJ	**2000 J**	110 J	3.3 UJ	36	12	2.8
G388	LW2-G388	26	09/09/2004	140 UJ	180 UJ	2.1 UJ	1.8 UJ	38	3.7	1.2 J
WLCOFH02M101	PP01M101	15	08/22/2002	3990 J	**39200 J**	427 UJ	877 UJ	132 UJ	52.4 UJ	261 UJ
WLCOFH02M103	PP01M103	15	08/22/2002	3300 J	**32500 J**	2010 J	807 UJ	121 UJ	48.2 UJ	240 UJ
WLCOFH02M104	PP01M104	15	08/22/2002	347 J	163 J	32.5 U	66.6 U	35.2	3.98 U	19.8 U
WLCOFH02M105	PP01M105	15	08/22/2002	2800 J	**2250 J**	339 UJ	695 UJ	**469 J**	41.5 UJ	207 UJ
WLCOFH02M106	PP01M106	15	08/22/2002	4110 J	**2260 J**	324 UJ	665 UJ	**450 J**	39.7 UJ	198 UJ
WLCOFH02M107	PP01M107	15	08/22/2002	178 J	68.4 U	43.8 J	65.1 U	9.8 U	3.89 U	19.4 U
WLCOFH02M108	PP01M108	15	08/22/2002	64.2 U	226	54.7 J	73.7 U	**160**	4.4 U	21.9 U
WLCOFH02M109	PP01M109	15	08/22/2002	498 J	**994**	223	76.8 U	**132**	4.59 U	22.9 U
WLCOFH02M110	PP01M110	15	08/22/2002	480 J	**377**	30.3 U	62.3 U	53.8	3.72 U	18.5 U
	PP01M102D	15	08/22/2002	3980 J	**7130 J**	364 UJ	747 UJ	112 UJ	44.6 UJ	222 UJ
PSYSEA98PSY08	PSY08S	10	04/07/1998	NA	**7590 J**	407	NA	**430**	31	15
	PSY51S	10	04/07/1998	NA	**6760 J**	512	NA	**922**	**78**	23
	PSY52S	10	04/07/1998	NA	**11400 J**	456	NA	**696**	**61**	27
	PSY53S	10	04/07/1998	NA	**11600 J**	1020	NA	**348**	**39**	21
WR-WSI98SD136	SD1360	10	09/22/1997	190 U	**2100**	62	19 U	**130**	19 U	19 U

DTNA 000103

Table 4-3
Semivolatile Organic Compounds in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Dibutyl Phthalate	Dimethyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)-pyrene
DEQ Level II SLVs—Bioaccumulation				60	NA	NA	NA	NA	NA
DEQ Level II SLVs—Toxicity				110	NA	NA	111	77	17
G380	LW2-G380	22	10/22/2004	16 U	5.3 U	3.5 U	**2400**	**160**	**240**
G383	LW2-G383	20	10/08/2004	7.7 J	4.6 UJ	3.1 UJ	94	6	**31**
G388	LW2-G388	26	09/09/2004	3.8 J	2.5 UJ	1.7 UJ	39	1.3 J	**19**
WLCOFH02M101	PP01M101	15	08/22/2002	1960 UJ	247 UJ	30100 J	**486 J**	**129 J**	52.4 UJ
WLCOFH02M103	PP01M103	15	08/22/2002	1800 UJ	228 UJ	1050 J	**815 J**	**103 J**	48.2 UJ
WLCOFH02M104	PP01M104	15	08/22/2002	149 U	18.8 U	44.4 U	38.6	7.98 U	3.98 U
WLCOFH02M105	PP01M105	15	08/22/2002	1550 UJ	196 UJ	463 UJ	**877 J**	**130 J**	41.5 UJ
WLCOFH02M106	PP01M106	15	08/22/2002	1480 UJ	188 UJ	596 J	**759 J**	79.6 UJ	39.7 UJ
WLCOFH02M107	PP01M107	15	08/22/2002	145 U	18.4 U	43.4 U	34	7.79 U	3.89 U
WLCOFH02M108	PP01M108	15	08/22/2002	164 U	20.8 U	49.1 U	**446**	25.5	**126**
WLCOFH02M109	PP01M109	15	08/22/2002	171 U	21.7 U	134 J	**220**	22.4	**76**
WLCOFH02M110	PP01M110	15	08/22/2002	139 U	17.6 U	64.8 J	99.6	19.7	3.72 U
	PP01M102D	15	08/22/2002	1670 UJ	211 UJ	676 J	**810 J**	89.5 UJ	44.6 UJ
PSYSEA98PSY08	PSY08S	10	04/07/1998	**71**	42	256	**674**	33	**155**
	PSY51S	10	04/07/1998	**61**	37	226	**3810**	**246**	**678**
	PSY52S	10	04/07/1998	**128**	127	433	**1660**	51	**314**
	PSY53S	10	04/07/1998	**87**	53	366	**597**	37	**173**
WR-WSI98SD136	SD1360	10	09/22/1997	19 U	19 J	19 U	**240**	19 U	**48**

Table 4-3
Semivolatile Organic Compounds in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Naphthalene	Pentachloro-phenol	Phenanthrene	Phenol	Pyrene	LPAHs	HPAHs	PAHs
DEQ Level II SLVs—Bioaccumulation				NA	370	NA	NA	NA	NA	NA	NA
DEQ Level II SLVs—Toxicity				176	NA	42	48	53	76	193	1610
G380	LW2-G380	22	10/22/2004	32	3 J	**1100**	8.5 J	**1700**	NA	NA	NA
G383	LW2-G383	20	10/08/2004	4.8 U	1.59 U	**45**	4.8 UJ	**91**	NA	NA	NA
G388	LW2-G388	26	09/09/2004	6.9 U	2.2 J	22	2.8 J	**75**	NA	NA	NA
WLCOFH02M101	PP01M101	15	08/22/2002	105 UJ	7	**243 J**	450 UJ	**440 J**	**372 A**	**926 A**	1300 A
WLCOFH02M103	PP01M103	15	08/22/2002	96.8 UJ	5.92	**425 J**	414 UJ	**834 J**	**595.9 A**	**2230 A**	**2830 A**
WLCOFH02M104	PP01M104	15	08/22/2002	12.8 J	0.897	20.6	34.2 U	48.5	39.55 A	158 A	198 A
WLCOFH02M105	PP01M105	15	08/22/2002	83.4 UJ	0.204 U	**369 J**	356 UJ	**769 J**	**744 A**	**2115 A**	**2860 A**
WLCOFH02M106	PP01M106	15	08/22/2002	79.8 UJ	0.194 U	**331 J**	341 UJ	**599 J**	**433 A**	**2832 A**	**3270 A**
WLCOFH02M107	PP01M107	15	08/22/2002	7.81 U	0.174 U	14.6 J	33.4 U	26.4	19.57 A	60.4 A	80 A
WLCOFH02M108	PP01M108	15	08/22/2002	14.4 J	0.204 U	**313**	37.8 U	**354**	**437 A**	**1764 A**	**2200 A**
WLCOFH02M109	PP01M109	15	08/22/2002	19.2 J	3.49	**93.9**	39.4 U	**208**	**191.6 A**	**1232 A**	1420 A
WLCOFH02M110	PP01M110	15	08/22/2002	13.7 J	0.178 U	**48.2**	31.9 U	**110**	**104.4 A**	**413 A**	517 A
	PP01M102D	15	08/22/2002	89.7 UJ	7.52	**94.5 J**	383 UJ	**808 J**	**292.7 A**	**1618 A**	**1910 A**
PSYSEA98PSY08	PSY08S	10	04/07/1998	27	100 U	**282**	163	**700**	**430 A**	**3282 A**	**3712 A**
	PSY51S	10	04/07/1998	84	100 U	**3120**	124	**5160**	**4196 A**	**15364 A**	**19560 A**
	PSY52S	10	04/07/1998	53	100 U	**531**	50 U	**1540**	**770 A**	**6469 A**	**7239 A**
	PSY53S	10	04/07/1998	38	100 U	**287**	50 U	**620**	**425 A**	**2936 A**	**3361 A**
WR-WSI98SD136	SD1360	10	09/22/1997	19 U	96 U	**110**	19 U	**220**	**129 A**	**1025 A**	1154 A

Table 4-4
Chlorinated Pesticides in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	2,4'-DDD	2,4'-DDE	2,4'-DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Alpha-Chlordane	Gamma-Chlordane
DEQ Level II SLVs—Bioaccumulation				0.3	0.3	0.3	0.3	0.3	0.3	NA	NA
DEQ Level II SLVs—Toxicity				4	1.5	4	4	1.5	4	4.5 [1]	4.5 [1]
PSYSEA98PSY08	PSY08S	10	04/07/1998	NA	NA	NA	2 U	**4**	**7**	2 U	**7**
	PSY51S	10	04/07/1998	NA	NA	NA	2 U	2 U	**3**	2 U	3 UB
	PSY52S	10	04/07/1998	NA	NA	NA	2 U	**5**	**8**	2 U	**5 B**
	PSY53S	10	04/07/1998	NA	NA	NA	2 U	**2**	**3**	2 U	3 UB
ORRORS00F12	OR46		07/01/2000	NA	NA	NA	**13**	**66**	**15**	2 U	2 U
WLCOFH02M101	PP01M101	15	08/22/2002	6.58 U	6.58 U	6.58 U	**4.04 JP**	**1.83 JP**	0.852 U	1.31 U	2.11 JP
WLCOFH02M103	PP01M103	15	08/22/2002	6.59 U	6.59 U	6.59 U	**2.49 J**	**1.9 JP**	0.854 U	1.31 U	1.99 JP
WLCOFH02M104	PP01M104	15	08/22/2002	5.15 U	5.15 U	5.15 U	0.501 U	0.593 U	0.667 U	1.02 U	1.05 U
WLCOFH02M105	PP01M105	15	08/22/2002	5.94 U	5.94 U	5.94 U	0.578 U	**1.03 JP**	0.77 U	1.57 J	2.3 JP
WLCOFH02M106	PP01M106	15	08/22/2002	4.9 U	4.9 U	4.9 U	0.477 U	0.564 U	0.635 U	0.975 U	0.996 U
WLCOFH02M107	PP01M107	15	08/22/2002	5.12 U	5.12 U	5.12 U	0.498 U	0.589 U	**1.33 J**	1.02 U	1.04 U
WLCOFH02M108	PP01M108	15	08/22/2002	5.78 U	5.78 U	5.78 U	0.562 U	0.666 U	0.749 U	1.15 U	1.17 U
WLCOFH02M109	PP01M109	15	08/22/2002	5.93 U	5.93 U	5.93 U	0.577 U	**1.06 JP**	0.768 U	1.18 U	1.2 U
WLCOFH02M110	PP01M110	15	08/22/2002	4.97 U	4.97 U	4.97 U	0.483 U	0.572 U	0.644 U	0.988 U	1.01 U
	PP01M102D	15	08/22/2002	5.71 U	5.71 U	5.71 U	0.555 U	0.657 U	0.74 U	1.13 U	2.9 P
G383	LW2-G383	20	10/08/2004	**0.538 NJ**	0.334 U	0.442 U	**0.721 J**	0.442 U	**3.06 NJ**	0.326 U	0.339 NJ
G380	LW2-G380	22	10/22/2004	**1.04 NJ**	**1.66 J**	**0.612 J**	**0.79 J**	**0.756 NJ**	**1.71 NJ**	0.164 UJ	0.103 U

Table 4-4
Chlorinated Pesticides in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	2,4'-DDD	Beta-Endosulfan	Beta-BHC	Dieldrin	Endosulfan Sulfate	Endrin Aldehyde	Endrin Ketone	Hexachloro-Benzene
DEQ Level II SLVs—Bioaccumulation				0.3	110	220	4	NA	NA	NA	NA
DEQ Level II SLVs—Toxicity				4	NA	NA	3	NA	NA	NA	100
PSYSEA98PSY08	PSY08S	10	04/07/1998	NA	2 U	2 U	6	4	4	2 U	NA
	PSY51S	10	04/07/1998	NA	2 U	2 U	3	2 U	2 U	2 U	NA
	PSY52S	10	04/07/1998	NA	2 U	2 U	6 U	2 U	2	2 U	NA
	PSY53S	10	04/07/1998	NA	2 U	2 U	6 U	2 U	2 U	2 U	NA
ORRORS00F12	OR46		07/01/2000	NA	NA	2 U	4	NA	NA	NA	NA
WLCOFH02M101	PP01M101	15	08/22/2002	6.58 U	1.27 U	1.39 U	1.08 U	1.2 U	1.34 U	0.924 U	3.29 U
WLCOFH02M103	PP01M103	15	08/22/2002	6.59 U	1.27 U	1.39 U	1.08 U	1.2 U	1.34 U	0.926 U	3.3 U
WLCOFH02M104	PP01M104	15	08/22/2002	5.15 U	0.995 U	1.09 U	0.845 U	0.937 U	1.05 U	0.724 U	2.57 U
WLCOFH02M105	PP01M105	15	08/22/2002	5.94 U	1.15 U	1.26 U	0.974 U	1.08 U	1.21 U	0.835 U	4.65 P
WLCOFH02M106	PP01M106	15	08/22/2002	4.9 U	0.948 U	1.04 U	0.804 U	0.892 U	1 U	0.689 U	2.45 U
WLCOFH02M107	PP01M107	15	08/22/2002	5.12 U	0.99 U	1.08 U	0.84 U	0.932 U	1.04 U	0.72 U	2.56 U
WLCOFH02M108	PP01M108	15	08/22/2002	5.78 U	1.12 U	1.22 U	0.949 U	1.05 U	1.18 U	0.813 U	2.89 U
WLCOFH02M109	PP01M109	15	08/22/2002	5.93 U	1.15 U	1.25 U	0.973 U	1.08 U	1.21 U	0.833 U	2.96 U
WLCOFH02M110	PP01M110	15	08/22/2002	4.97 U	0.96 U	1.05 U	0.815 U	0.904 U	1.01 U	0.698 U	2.48 U
	PP01M102D	15	08/22/2002	5.71 U	2.19 JP	1.21 U	0.936 U	1.04 U	1.16 U	0.802 U	2.85 U
G383	LW2-G383	20	10/08/2004	**0.538 NJ**	0.235 U	2.01	0.501 U	0.723 UJ	0.428 U	0.288 U	1.21 NJ
G380	LW2-G380	22	10/22/2004	**1.04 NJ**	0.118 U	0.166 U	0.252 U	0.363 UJ	0.215 U	0.911 NJ	0.088 U

Table 4-5
Polychlorinated Biphenyls in Sediment Adjacent to COP M-1 Outfall (µg/kg)
Swan Island Basin
Portland, Oregon

Location	Sample ID	Depth (cm bml)	Date	Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
DEQ Level II SLVs—Bioaccumulation				420	2	4	10	NA
DEQ Level II SLVs—Toxicity				NA	NA	21	7	NA
G380	LW2-G380	22	10/22/2004	2.5 U	2.55 U	**32.7**	**113**	29.1
G383	LW2-G383	20	10/08/2004	1.21 U	1.23 U	**5.97** J	**22.9**	6.68 J
G388	LW2-G388	26	09/09/2004	2.56 U	2.6 U	**11.9**	**86.4**	16.7 J
WLCOFH02M101	PP01M101	15	08/22/2002	7.7 U	3.67 U	**41.7**	**62.5**	91.2
WLCOFH02M103	PP01M103	15	08/22/2002	8.75 U	4.17 U	3.09 U	**59.5**	61.5
WLCOFH02M104	PP01M104	15	08/22/2002	6.8 U	3.24 U	2.4 U	2.07 U	3.65 U
WLCOFH02M105	PP01M105	15	08/22/2002	46	3.3 U	**78.5**	**78.7**	135
WLCOFH02M106	PP01M106	15	08/22/2002	6.59 U	3.14 U	2.33 U	**19.7**	14.8
WLCOFH02M107	PP01M107	15	08/22/2002	6.18 U	2.94 U	2.18 U	1.88 U	3.31 U
WLCOFH02M108	PP01M108	15	08/22/2002	7.43 U	3.54 U	2.62 U	2.26 U	13.5
WLCOFH02M109	PP01M109	15	08/22/2002	7.61 U	**28.7**	**39.9**	**32.9**	89.6
WLCOFH02M110	PP01M110	15	08/22/2002	7.05 U	3.36 U	2.49 U	2.14 U	8.79
	PP01M102D	15	08/22/2002	8.87 U	4.23 U	**106**	**99.5**	141
ORRORS00F12	OR46		07/01/2000	NA	NA	NA	NA	NA
PSYSEA98PSY08	PSY08S	10	04/07/1998	10 U	10 U	10 U	**156**	53
	PSY51S	10	04/07/1998	10 U	10 U	10 U	**39**	40
	PSY52S	10	04/07/1998	10 U	10 U	10 U	**157**	74
	PSY53S	10	04/07/1998	10 U	10 U	10 U	**52**	49

Table 4-6
Sediment Chemicals of Interest
Sediment Adjacent to COP M-1 Outfall
Swan Island Basin
Portland, Oregon

Chemical	COI in Sediment?	Rationale
Metals		
Cadmium	Yes	Concentration > Background and Toxicity and Bioaccumulation SLVs
Chromium	Yes	Concentration > Background and Toxicity SLV
Copper	Yes	Concentration > Background and SLVs
Lead	Yes	Concentration > Background and Toxicity SLV
Nickel	Yes	Concentration > Background and Toxicity SLV
Zinc	Yes	Concentration > Background and Toxicity and Bioaccumulation SLVs
SVOCs		
Acenaphthylene	Yes	Concentration > Toxicity SLV
Anthracene	Yes	Concentration > Toxicity SLV
Benzo(a)anthracene	Yes	Concentration > Toxicity SLV
Benzo(a)pyrene	Yes	Concentration > Toxicity and Bioaccumulation SLVs
Benzo(g,h,i)perylene	Yes	Concentration > Toxicity SLV
Benzo(k)fluoranthene	Yes	Concentration > Toxicity SLV
Chrysene	Yes	Concentration > Toxicity SLV
Dibenz(a,h)anthracene	Yes	Concentration > Toxicity SLV
Fluoranthene	Yes	Concentration > Toxicity SLV
Fluorene	Yes	Concentration > Toxicity SLV
Indeno(1,2,3-cd)pyrene	Yes	Concentration > Toxicity SLV
Phenanthrene	Yes	Concentration > Toxicity SLV
Pyrene	Yes	Concentration > Toxicity SLV
bis(2-Ethylhexyl)phthalate	Yes	Concentration > Toxicity and Bioaccumulation SLVs
Dibutyl phthalate	Yes	Concentration > Toxicity and Bioaccumulation SLVs
Phenol	No	Concentration < SLVs in samples collected in 2002 and 2004.
Chlorinated Pesticides		
DDT	Yes	Concentration > Toxicity and Bioaccumulation SLVs
DDD	Yes	Concentration > Toxicity and Bioaccumulation SLVs
DDE	Yes	Concentration > Toxicity and Bioaccumulation SLVs
Gamma-chlordane	Yes	Concentration > Toxicity SLV
Dieldrin	Yes	Concentration > Toxicity and Bioaccumulation SLVs
PCBs		
Aroclor 1242	Yes	Concentration > Bioaccumulation SLV
Aroclor 1248	Yes	Concentration > Toxicity and Bioaccumulation SLVs
Aroclor 1254	Yes	Concentration > Toxicity and Bioaccumulation SLVs

Table 5-1
Stormwater Data for North Ensign Outfall (mg/L)
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Date	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	pH	Total Suspended Solids	Oil & Grease
JSCS Stormwater SLVs—Human Health	NV	NV	NV	NV	4.60	26	NV	NV	NV
JSCS Stormwater SLVs—Ecological	0.000094	NV	0.0027	0.00054	0.016	0.036	NV	NV	NV
JSCS Stormwater SLVs—Drinking Water	0.005	0.1	1.30	0.015	0.73	5	NV	NV	NV
Benchmark (mg/L)	NA	NA	0.1	0.4	NA	0.6	5.5-9.0 SU	130	10
6/22/1993	**0.001**	0.001	**0.15**	**0.0062**	0.01	**0.098**	7	<10	3.7
9/8/1994	**0.005**	0.054	**0.07**	**0.024**	0.01	**0.47**	7.5	66	13
3/13/1995	--	--	**0.05**	**0.007**	--	**0.08**	6.65	24	11
4/12/1995	<0.001	<0.003	**0.012**	<0.02	--	**0.547**	7.1	18.8	24
10/2/1995	**0.001**	0.01	**0.09**	**0.017**	0.01	**0.08**	7.17	6	< 3.0
11/27/1995	**0.003**	0.011	**0.018**	**0.02**	0.011	**0.196**	7.5	59.2	7.9
3/4/1996	**0.001**	0.024	**0.03**	**0.011**	0.01	**0.21**	6.87	24	< 3.0
10/15/1996	**0.0007**	0.002	**0.08**	**0.003**	0.01	**0.08**	7.02	3	< 3.0
10/18/1996	**0.00091**	0.0089	**0.032**	**0.0056**	0.0038	**0.16**	6.78	51.6	7.3
3/7/1997	**0.0013**	0.01	**0.05**	**0.01**	0.01	**0.2**	6.99	39	< 3.0
10/30/1997	**0.0009**	0.005	< 0.02	<0.05	0.01	**0.21**	7.19	100	< 3.0
1/21/1998	--	--	**0.027**	<0.1	--	**0.684**	7.3	22	<5.0
3/3/1998	--	--	< 0.02	< 0.05	--	**0.11**	7.05	11	< 3.0
11/4/1998	--	--	<0.002	<0.001	--	**0.2**	6.78	7	< 5.0
11/20/1998	--	--	**0.031**	<0.1	--	**0.221**	6.7	39	7.4
5/11/1999	--	--	**0.02**	<0.001	--	**0.75**	6.52	26	< 5.0
12/16/1999	--	--	**0.014**	<0.001	--	**0.201**	7.2	5	< 5.0
5/8/2000	--	--	**0.0334**	<0.001	--	**0.871**	7.1	110	13
12/19/2000	--	--	**0.0342**	**0.00289**	--	**0.148**	6.7	13	< 5.0
5/14/2001	--	--	**0.0313**	**0.00144**	--	**0.24**	6.67	11	< 5.0
11/21/2001	--	--	< 0.050	< 0.200	--	**0.75**	6	17	< 5.0
11/30/2001	--	--	<0.002	<0.001	--	**0.331**	6.5	38	< 5.0
12/20/2001	--	--	**0.0287**	<0.001	--	**0.493**	5	<10	< 5.0

Table 5-1
Stormwater Data for North Ensign Outfall (mg/L)
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Date	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	pH	Total Suspended Solids	Oil & Grease
JSCS Stormwater SLVs—Human Health	NV	NV	NV	NV	4.60	26	NV	NV	NV
JSCS Stormwater SLVs—Ecological	0.000094	NV	0.0027	0.00054	0.016	0.036	NV	NV	NV
JSCS Stormwater SLVs—Drinking Water	0.005	0.1	1.30	0.015	0.73	5	NV	NV	NV
Benchmark (mg/L)	NA	NA	0.1	0.4	NA	0.6	5.5-9.0 SU	130	10
6/17/2002	--	--	<0.002	<0.001	--	**0.992**	6.8	25	< 5.0
11/13/2002	--	--	**0.0301**	<0.001	--	**0.343**	7.37	14	< 5.0
4/23/2003	--	--	**0.0153**	**0.00331**	--	**0.626**	7.2	18	< 5.0
10/15/2003	--	--	**0.0148**	**0.00299**	--	**0.686**	7.62	<10	< 5.0
8/6/2004[2]	--	--	--	--	--	--	--	--	--
1/7/2005	--	--	**0.0192**	**0.00859**	--	**0.575**	7.19	56	9.25
5/9/2005	--	--	**0.012**	**0.00364**	--	**0.397**	5.94	16	< 5
11/18/2005	--	--	**0.0128**	**0.00502**	--	**0.288**	6.36	31	<4.76
Minimum	0.0007	0.001	0.012	0.00144	0.0038	0.08	5	3	3.7
Maximum	0.005	0.054	0.15	0.024	0.011	0.992	7.62	110	24
Average	0.0016	0.014	0.032	0.013	0.009	0.375	6.859	28.853	10.728
Standard Deviation	0.0014	0.016	0.031	0.021	0.002	0.262	0.535	27.032	5.798

Table 5-2
Stormwater Quality for North Fathom Outfall (mg/L)
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Date	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	pH	Total Suspended Solids	Oil & Grease
JSCS Stormwater SLVs—Human Health	NV	NV	NV	NV	4.60	26	NV	NV	NV
JSCS Stormwater SLVs—Ecological	0.000094	NV	0.0027	0.00054	0.016	0.036	NV	NV	NV
JSCS Stormwater SLVs—Drinking Water	0.005	0.1	1.3	0.015	0.73	5	NV	NV	NV
Benchmark (mg/L)	NA	NA	0.1	0.4	NA	0.6	5.5-9.0 SU	130	10
6/22/1993	**0.002**	0.001	**0.079**	**0.011**	0.01	**0.32**	7	26	16
9/8/1994	**0.002**	0.008	**0.03**	**0.015**	0.01	**0.45**	7.52	16	9
3/13/1995	**0.003**	0.008	**0.03**	**0.009**	--	**0.18**	6.53	34	8
4/12/1995	<0.001	0.039	**0.041**	<0.02	0.004	**0.329**	7.1	85	16
9/29/1995	**0.003**	0.006	**0.03**	**0.007**	0.01	**0.17**	7.09	20	5
11/27/1995	**0.001**	0.003	**0.007**	**0.02**	0.004	**0.18**	7.2	41.6	11
3/4/1996	**0.002**	0.006	< 0.02	**0.013**	0.01	**0.36**	6.93	37	4
10/15/1996	**0.0028**	0.004	**0.04**	**0.015**	0.01	**0.27**	7.23	25	< 3.0
10/18/1996	**0.0023**	0.0046	**0.02**	**0.058**	0.0033	**0.2**	6.3	20	11
3/7/1997	**0.003**	0.008	< 0.02	**0.012**	0.01	**0.41**	6.6	44	4
10/2/1997	<0.04	<0.02	**0.027**	<0.3	<0.05	<0.02	7.3	1	5.5
10/30/1997	**0.001**	0.002	< 0.02	< 0.05	0.01	**0.22**	7.1	10	< 3.0
1/21/1998	--	--	**0.037**	<0.1	--	**1.45**	7	82	8.3
3/3/1998	--	--	< 0.02	< 0.05	--	**0.33**	6.85	29	4
11/4/1998	--	--	**0.03**	<0.001	--	**0.78**	6.66	110	7
11/20/1998	--	--	<0.03	<0.1	--	**0.262**	6.4	37.3	9.1
5/11/1999	--	--	<0.002	<0.001	--	**0.87**	6.62	29	3
12/16/1999	--	--	**0.017**	<0.001	--	**0.279**	7.2	150	< 5.0
5/8/2000	--	--	**0.016**	<0.001	--	**1.14**	7.2	30	9
12/19/2000	--	--	**0.0334**	**0.0224**	--	**0.435**	6.7	33	7.26
5/14/2001	--	--	**0.0453**	**0.00935**	--	**0.918**	6.43	171	< 5.0
11/21/2001	--	--	<0.050	<0.200	--	**0.643**	6.3	13	< 5.0
11/30/2001	--	--	<0.002	<0.001	--	**0.362**	6.9	43	6.76
12/20/2001	--	--	<0.002	<0.001	--	**0.636**	5	<10	< 5.0

Table 5-2
Stormwater Quality for North Fathom Outfall (mg/L)
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Date	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	pH	Total Suspended Solids	Oil & Grease
JSCS Stormwater SLVs—Human Health	NV	NV	NV	NV	4.60	26	NV	NV	NV
JSCS Stormwater SLVs—Ecological	0.000094	NV	0.0027	0.00054	0.016	0.036	NV	NV	NV
JSCS Stormwater SLVs—Drinking Water	0.005	0.1	1.3	0.015	0.73	5	NV	NV	NV
Benchmark (mg/L)	NA	NA	0.1	0.4	NA	0.6	5.5-9.0 SU	130	10
6/17/2002	--	--	**0.0323**	<0.001	--	**0.268**	6.9	46	< 5.0
11/13/2002	--	--	<0.002	<0.001	--	**0.544**	7.19	28	< 5.0
3/7/2003	--	--	**0.00696**	**0.00286**	--	**0.641**	6.45	11	< 5.0
4/23/2003	--	--	**0.0108**	**0.00321**	--	**0.724**	7.34	<10	< 5.0
10/15/2003	--	--	**0.00802**	**0.00331**	--	**0.244**	7.63	14	< 5.0
8/6/2004	--	--	**0.0375**	**0.0155**	--	**0.506**	6.76	<10	17.4
1/7/2005	--	--	**0.0433**	**0.0308**	--	**0.541**	7.17	129	10
5/9/2005	--	--	**0.00827**	**0.00173**	--	**0.201**	6.04	<10	< 5
11/18/2005	--	--	**0.00985**	**0.00391**	--	**0.176**	6.51	31	8.94
Minimum	0.001	0.001	0.00696	0.00173	0.0033	0.17	5	1	3
Maximum	0.003	0.039	0.079	0.058	0.01	1.45	7.63	171	17.4
Average	0.002	0.008	0.028	0.014	0.010	0.470	6.823	46.410	8.584
Standard Deviation	0.00077	0.0105	0.017	0.013	0.0030	0.305	0.502	43.043	4.042

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Table 6-1
Data Quality Objectives
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Analysis	Accuracy	Precision	Completeness	Method	Reference
Water					
Total Metals Method 6020	±25%	±25%	95%	Digestion—ICP/MS	SW-846
Hexavalent Chromium Method 7196	±25%	±25%	95%	Colorimetric	SW-846
Phthalates and PAHs Method 8270	—[3]	—[3]	95%	Extraction—GC/MS - SIM	SW-846
PCBs Method 8082	±25%	±25%	95%	Extraction—GC	SW-846
Solids					
Total Metals Method 6020	±25%	±25%	95%	Digestion—ICP/MS	SW-846
Phthalates and PAHs Method 8270	—[3]	—[3]	95%	Extraction—GC/MS - SIM	SW-846
PCBs Method 8082	±25%	±25%	95%	Extraction—GC	SW-846

Table 6-2
Sample Analyses, Containers, and Preservation
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Matrix	Parameter	Container Type	Preservation and Handling	Maximum Holding Time
Water	Copper, Lead, and Zinc	500-ml HDPE	HNO_3 to pH<2; Cool to 4°C	Six Months
	Hexavalent Chromium	500-ml HDPE	Cool to 4°C	24 hours
	Phthalates and PAHs	Amber 1-liter glass	Cool to 4°C	Seven days until extraction, 40 days after extraction
	PCBs	Amber 1-liter glass	Cool to 4°C	Seven days until extraction, 40 days after extraction
Solids	Copper, Lead, and Zinc	Clear 8 oz. glass	Cool to 4°C	Six Months
	Phthalates and PAHs	Clear 8 oz. glass	Cool to 4°C	14 days until extraction, 40 days after extraction
	PCBs	Clear 8 oz. glass	Cool to 4°C	14 days until extraction, 40 days after extraction

Table 6-3
Method Reporting Limits and Screening Levels for Stormwater (µg/L)
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Analysis	JSCS Screening Value (lowest value)	Method Reporting Limits
Metals		
Copper	2.7	0.5
Chromium, hexavalent	11	5
Lead	0.54	0.1
Zinc	36	10
PAHs		
Acenaphthylene	0.2	0.05
Anthracene	0.2	0.05
Benzo(a)anthracene	0.018	0.02
Benzo(a)pyrene	0.018	0.02
Benzo(g,h,i)perylene	0.2	0.05
Benzo(k)fluoranthene	0.018	0.02
Chrysene	0.018	0.02
Dibenz(a,h)anthracene	0.018	0.02
Fluoranthene	0.2	0.05
Fluorene	0.2	0.05
Indeno(1,2,3-cd)pyrene	0.018	0.02
Phenanthrene	0.2	0.05
Pyrene	0.2	0.05
PHTHALATES		
bis(2-Ethylhexyl)phthalate	2.2	1
Dibutyl phthalate	3	1
PCBs		
Aroclor 1242	0.053	0.025
Aroclor 1248	0.081	0.025
Aroclor 1254	0.033	0.025

Table 6-4
Method Reporting Limits and Screening Levels for Stormwater System Cleanout Solids (µg/kg)
Truck Manufacturing Plant
Freightliner LLC
Portland, Oregon

Analysis	JSCS Screening Value (lowest value)	Method Reporting Limits
Metals		
Copper	10,000	1000
Lead	128,000	2000
Zinc	3,000	1000
PAHs		
Acenaphthylene	200	6.67
Anthracene	845	6.67
Benzo(a)anthracene	1,050	6.67
Benzo(a)pyrene	1,450	6.67
Benzo(g,h,i)perylene	300	6.67
Benzo(k)fluoranthene	13,000	6.67
Chrysene	1,290	6.67
Dibenz(a,h)anthracene	1,300	6.67
Fluoranthene	2,230	6.67
Fluorene	536	6.67
Indeno(1,2,3-cd)pyrene	100	6.67
Phenanthrene	1,170	6.67
Pyrene	1,520	6.67
Phthalates		
bis(2-Ethylhexyl)phthalate	330	66.7
Dibutyl phthalate	100	66.7
PCBs		
Aroclor 1242	2	4
Aroclor 1248	4	4
Aroclor 1254	10	4

FIGURES

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0 2000 4000
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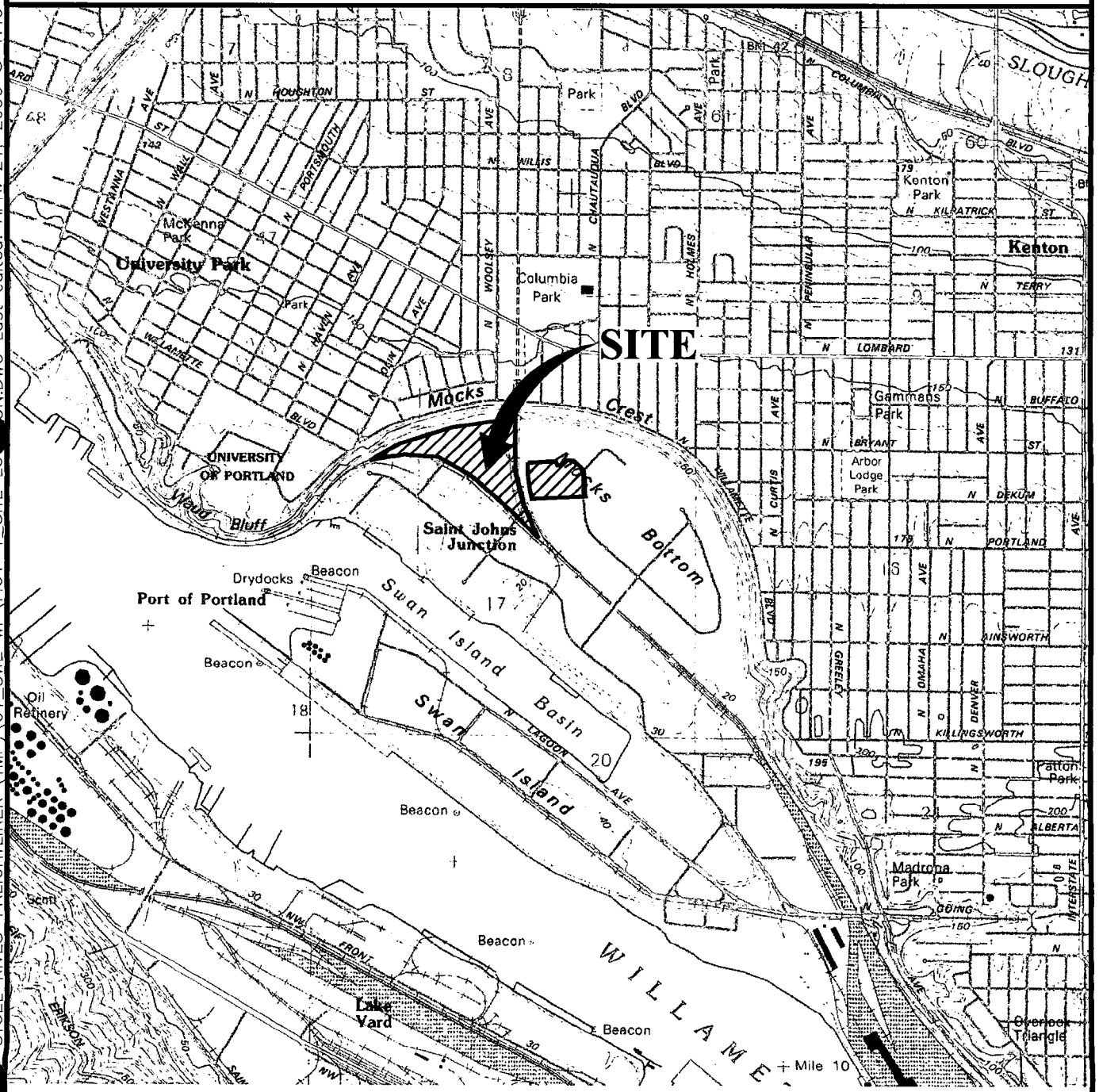
Figure 1-1
Site Location

Freightliner LLC
Truck Manufacturing Plant
Portland, Oregon

Source: Base map prepared from DeLorme 3-D TopoQuads (1999)
Site Address: 6936 N. Fathom Street, Portland, Oregon
Section: 17 Township: 1N Range: 1E Of Willamette Meridian



Legend:
Site (Property Owned by Freightliner LLC)

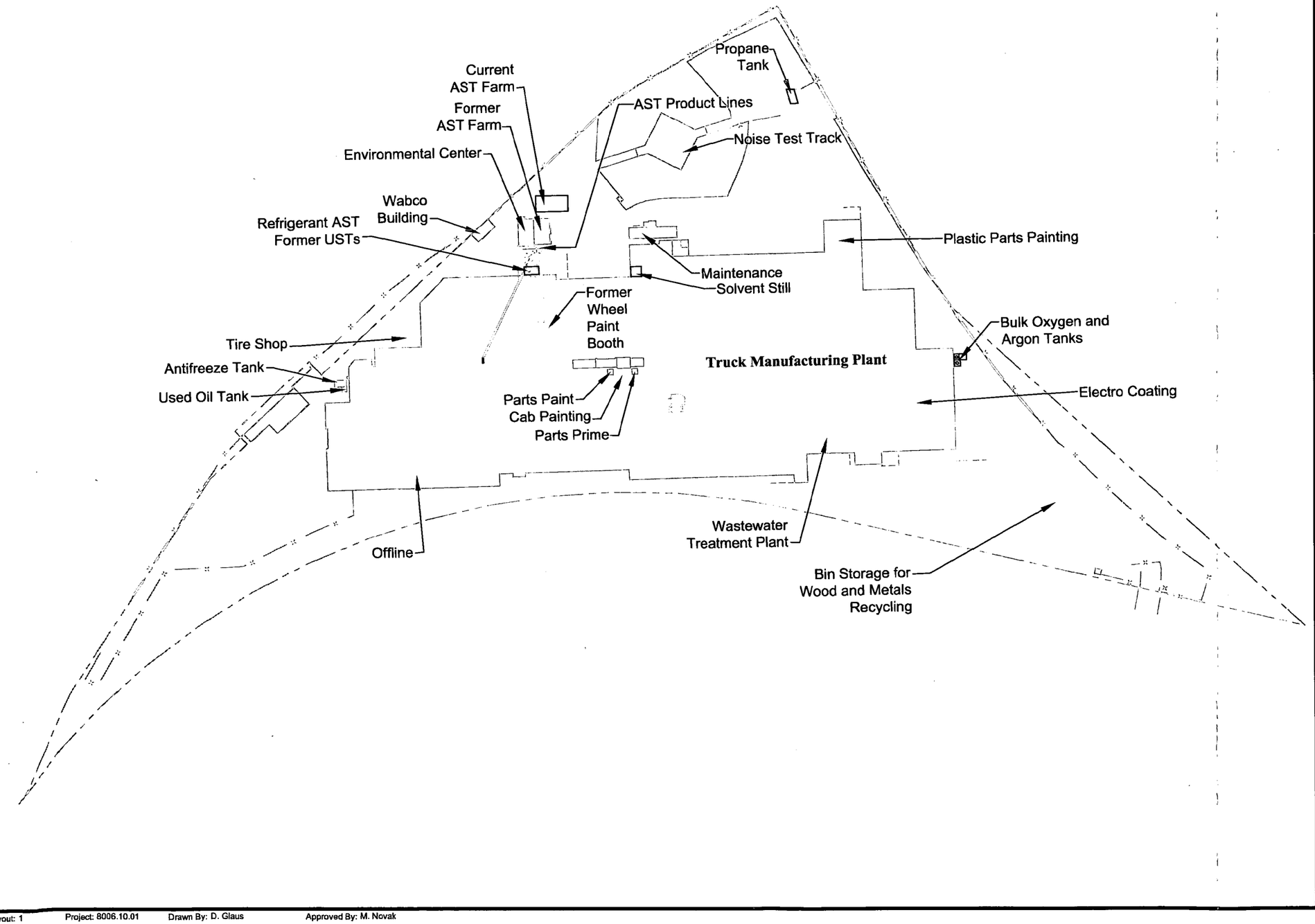
File: G:\800_STOEL_RIVES-FREIGHTLINER (TMP)\01_SWE WP\FIG1-1_SITE LOCATION.DWG Last edited: APR. 21, 2006 @ 1:49 p.m. by: cadduser plotstyles: none blac

Layout: 1 Project: 8006.10.01 Drawn By: D. Glaus Approved By: M. Novak

DTNA 000119

Figure 2-1
Facility Features

Freightliner LLC
Truck Manufacturing Plant
Portland, Oregon



Legend:
- Property Boundary
- Fence Line
- Retaining Wall

N

0 200 400

FEET

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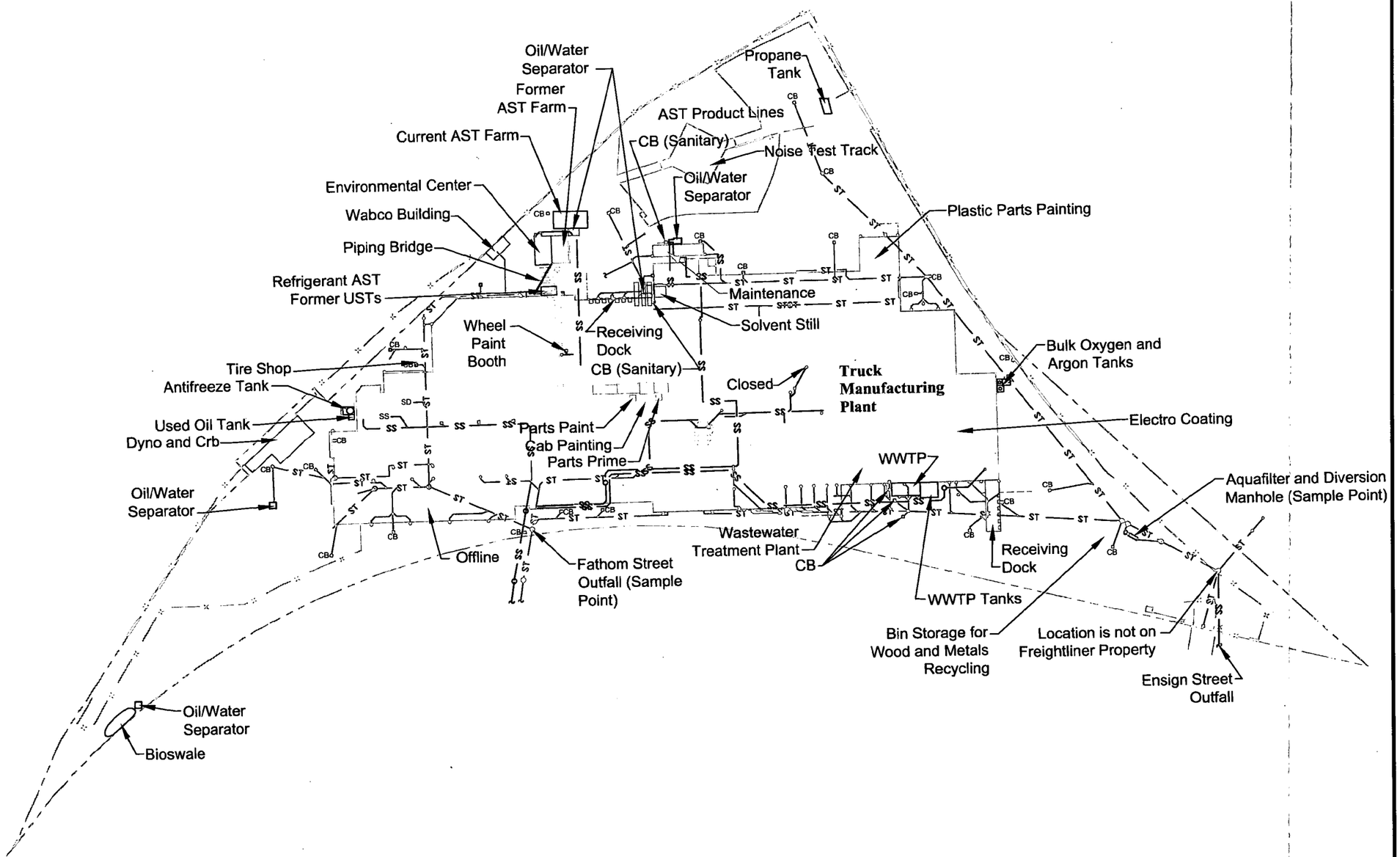
File: G:\8006.10 ST...\VES-FREIGHTLINER (TMP)\01 SWE WP\FIG2-1 SITE FEATURES.DWG Last edited: APR. 21, 2006 @ 1... by: cadduser Xrefs: survey-base, Survey-wells, black/white

Layout: 1 Project: 8006.10.01 Drawn By: D. Glaus Approved By: M. Novak

DTNA 000120

Figure 3-1
Stormwater System and Facility Operations
Freightliner LLC
Truck Manufacturing Plant
Portland, Oregon



Legend:

- Property Boundary
- Fence Line
- Retaining Wall
- ST — Storm Sewer Line
- SS — Sanitary Sewer Line
- Catch Basin
- Manhole

Notes:

1) Storm sewer from Freightliner LLC.

2) Survey by Chase Jones & Associates, 11/16/02, updated 01/24/03.

N

0 200 400

FEET

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File: G:\8006.10 ST\...ES-FREIGHTLINER (TMP)\01_SWE WP\FIG3-1_STORMWATER SYSTEM.DWG Last edited: APR. 21, 20...51 p.m. by: cadduser Xrefs: survey-base, Survey-wells 100% Color

Layout: 1 Project: 8006.10.01 Drawn By: D. Glaus Approved By: M. Novak

DTNA 000121

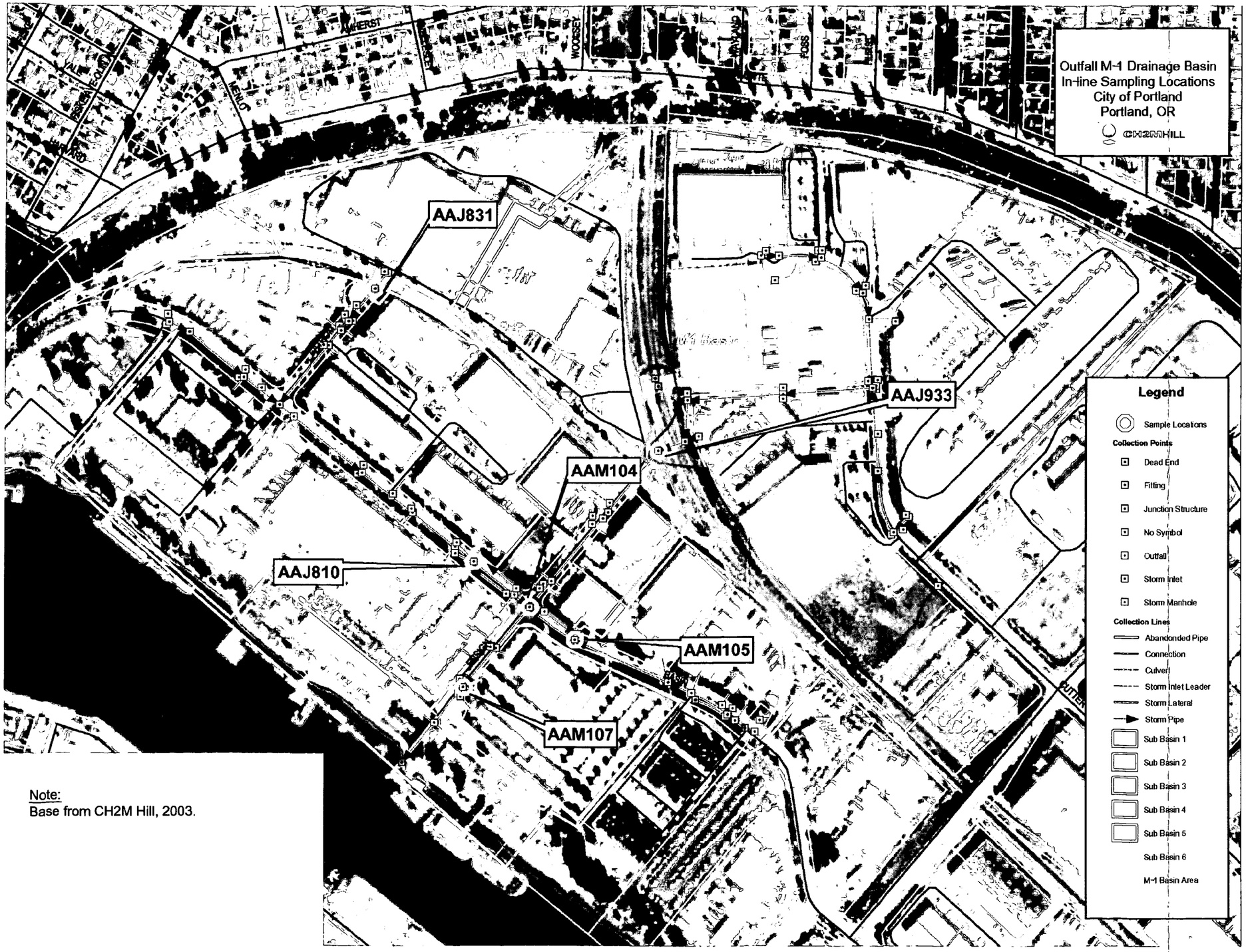

Figure 3-2
City of Portland
Drainage Basin M-1
Freightliner LLC
Truck Manufacturing Plant
Portland, Oregon

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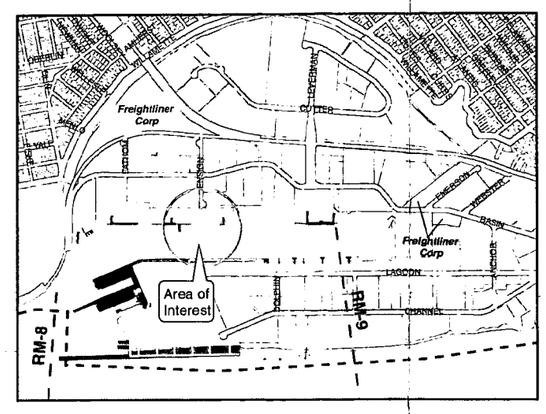
Figure 4-1
Sediment Sample Locations Near COP Outfall M-1

Portland, Oregon



ENSIGN

WR-WSI98SD136
ORRORS00F12
OFM-1
G380
WLCOFH02M108
WLCOFH02M105
WLCOFH02M107
G388
WLCOFH02M109
G383
WLCOFH02M103
WLCOFH02M110
PSYSEA98PSY08
WLCOFH02M104
WLCOFH02M101
WLCOFH02M106

Legend

- City of Portland Outfalls
- Historical Sample Locations
- Round 2a Surface Sample Locations
- Willamette River
- Dock Structures

*Note: Bathymetry = 5ft Contour Intervals
*Note: Outfall information contained on this map is accurate according to available records and is based on a variety of sources that were not developed to have the data quality that may be required for assessing these outfalls as sources to river sediment sample concentrations. The City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published.
*Source: Historical and Round 2a sample locations from LWG.
*Source: River miles, dock structures, bathymetry, outfalls, and navigation channel from LWG.

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File: X:\Projects\8006\8006.10 Freightliner Corp\Fig4-1 TMP

Project: 8006.10.01/06 Produced By: TJV Approved By: M. Novak

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